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DESCRIPTORS- *VOCATIONAL EDUCATION, PROGRAM PLANNING, SYSTEMS ANALYSIS, *COST EFFECTIVENESS, PROGRAM BUDGETING, *EDUCATIONAL OBJECTIVES, TRAINING OBJECTIVES, PROGRAM EFFECTIVENESS, *PROGRAM EVALUATION, TECHNICAL EDUCATION, *EDUCATIONAL PLANNING, INDUSTRY, JOB TRAINING, CONFERENCES, CURRICULUM PLANNING, RESOURCE ALLOCATIONS, BIBLIOGRAPHIES, PPB SYSTEM,

RECOMMENDATIONS, CONCLUSIONS, AND POSITION PAPERS BASED ON THE RESULTS OF A DIAGNOSTIC SURVEY CONDUCTED IN SIX STATES AND 11 COMMUNITIES ARE REPORTED. THEY CONCERN--(1) IDENTIFICATION OF THE OBJECTIVES AND GOALS OF OCCUPATIONAL EDUCATION, (2) STRUCTURING OF ALTERNATIVE PROGRAMS TO ACHIEVE THEM, (3) COST-BENEFIT ANALYSIS, AND (4) PROJECTIONS OF MANPOWER SUPPLY AND DEMAND. WITH THE SURVEY FINDINGS AND THE POSITION PAPERS AS BACKGROUND, AN INTERDISCIPLINARY CONFERENCE WAS HELD AT AIRLIE HOUSE WITH 38 PARTICIPANTS INCLUDING ECONOMISTS, VOCATIONAL EDUCATORS, UNIVERSITY AND RESEARCH PERSONNEL, ADMINISTRATORS, SYSTEMS ANALYSTS, AND PLANNERS TO DETERMINE THE PROBLEMS ASSOCIATED WITH PLANNING AND PROGRAMING VOCATIONAL EDUCATION. PART I OF THE REPORT INCLUDES "MAJOR RECOMMENDATIONS AND CONCLUSIONS," BY ARNOLD KOTZ. PART II IS CONCERNED WITH HOW OBJECTIVES AND GOALS ARE DETERMINED BY STATES AND COMMUNITIES. OBJECTIVES IDENTIFIED IN THE DIAGNOSTIC SURVEY ARE DISCUSSED. POSITION PAPERS ARE--(1) "OBJECTIVES AND GOALS OF OCCUPATIONAL EDUCATION" BY GRANT VENN, (2) "EVALUATING VOCATIONAL EDUCATION--PROBLEMS AND PRIORITIES," BY GARTH MANGUM, AND (3) "PROBLEMS OF APPLICATION OF THE PROGRAM PLANNING AND BUDGETING SYSTEM TO EDUCATION," BY CHARLES HITCH. PART III, CONCERNING ALTERNATIVE PROGRAMS TO ACHIEVE OCCUPATIONAL EDUCATION OBJECTIVES, INCLUDES THE PAPERS--(1) "AN EDUCATIONAL SYSTEM FOR THE SEVENTIES," BY DAVID BUSHNELL AND ROBERT MORGAN, (2) "AN INDUSTRIAL APPROACH TO OCCUPATIONAL TRAINING," BY WILBUR LANDIS, AND (3) "IMPROVED PLANNING FOR VOCATIONAL AND TECHNICAL EDUCATION--A STATE DIRECTOR'S PERSPECTIVE," BY ROBERT WORTHINGTON. TRANSCRIPTS OF DISCUSSIONS FOLLOWING SOME SPEECHES, A LIST OF PARTICIPANTS, OBJECTIVES IDENTIFIED IN THE SURVEY, STEPS IN THE PROGRAM PLANNING AND BUDGETING APPROACH, AND A BIBLIOGRAPHY OF 111 REFERENCES USED IN THE PROJECT ARE INCLUDED. ADDITIONAL PAPERS ARE INCLUDED IN VOLUME TWO (VT 005 042). THIS DOCUMENT IS AVAILABLE FOR $6.00 FROM STANFORD RESEARCH INSTITUTE, ROSSLYN PLAZA, 1611 NORTH KENT STREET, ARLINGTON, VIRGINIA 22209. (EM)

A Research Study

OCCUPATIONAL EDUCATION: PLANNING AND PROGRAMMING

VOLUME ONE

September 1967

Arnold Kotz, Editor

STANFORD
RESEARCH
INSTITUTE

MENLO PARK
CALIFORNIA

Prepared for:

U.S. OFFICE OF EDUCATION
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STANFORD RESEARCH INSTITUTE

MENLO PARK, CALIFORNIA 94025

September 15, 1967

The Honorable Harold Howe II
Commissioner
U.S. Office of Education
Department of Health, Education, and Welfare
Washington, D.C.

Dear Sir:

Submitted herewith is a report entitled, "Occupational Education: Planning and Programming." It is a summary of brief reconnaissance surveys conducted by Stanford Research Institute in six states and eleven communities and of a conference held on new approaches to planning and programming of occupational education. The research was commissioned by the U.S. Office of Education.

The research identified many significant issues with respect to planning and programming for consideration by occupational educators generally. The research pulled out of context and examined the planning and decision-making processes separately from the very live operation of the educational process and its daily impact on youth and adults throughout the country. It was deficiency and problem oriented by design. It was not intended to document the real accomplishments of occupational educators, whose efforts have resulted in the placement of many thousands of youths in jobs throughout the nation.

Current planning and programming concepts now in use in vocational education have evolved over several decades. The research indicated that a number of individual elements of a modern, comprehensive planning, programming, and decision-making system already exist in part in most states and communities. Many elements, however, such as the development of alternative strategies and analyses to facilitate choice among them have received only nodding attention. Some important analytical approaches, such as the use of benefit/cost analyses, are almost completely absent. Vocational education programs and budgets are largely developed by building on the basis of the prior year's experience--the "incremental" approach. Such an approach may be acceptable if the world of today and of the future is to be much like that of yesterday. However, the many rigidities built into the incremental approach make it unresponsive to the requirements of technological developments and the changing world of work.

The research found areas where significant improvements in policy formation and in planning concepts and methodology are essential if allocation of federal, state, and local resources is to contribute in an optimum manner to multiple objectives and goals. The objectives include: development of vocational competencies and general capabilities for life and social adjustment; development of a trained work force to meet the job demands of the private and public sector; contributions to economic growth and development; bringing the disadvantaged productivity into the mainstream of economic life; accomodating other student interests; and satisfying many other demands placed on the educational system.

First, national, state, and local objectives set forth in numerous documents are frequently difficult to harmonize, sometimes inconsistent, and require choice as to which among several goals should be pursued actively by a particular program and which should be inhibited or minimized. The exhortation in the several pieces of legislation affecting vocational and technical education that many programs should be encouraged, including homemaking, does not make the choice among programs to achieve objectives easier or less necessary.

Second, alternative ways to achieve the objectives are available through different course offerings to meet job demand, MDTA-type training, proprietary schools, subsidy to industry and on-the-job training, and other approaches competitive with regular public educational institutions. There are now insufficient data and analysis to facilitate choice of the most efficient and effective manner of achieving national, state, and local objectives. There is insufficient recognition of the need for having alternative courses of action and projects meet tests of economic efficiency prior to approval and implementation. Benefit/cost analyses are seldom applied to compare alternative strategies.

Third, priorities should be established among the approved programs so that important requirements may not go unattended while resources are allocated to marginal programs.

Fourth, substantial expenditures are made and planned for the future for facilities without sufficient understanding or economic analysis of their role in the educational system. The decision, for example, to defer occupational choice to postsecondary time frames would require a different allocation of resources to facilities than would a decision to blanket the states with area vocational schools at the secondary level.

Fifth, agreements between the Departments of Labor and Health, Education, and Welfare at national and state levels describe the advantages of surveys of job vacancies and demand by the Department of Labor and their use in training programs by vocational educators. If reliance is placed solely on the agreements, a pace faster than the current one toward the goal does not appear likely. Department of Labor forecasts frequently are not timely, are not projected far enough into the future, and are of only limited value to vocational educators. The joint agreements require joint concepts, methodology, and working and funding arrangements for more rapid progress toward the desired ends.

Sixth, the so-called state plan required by the U.S. Office of Education is neither an annual, intermediate, or long range plan. It is merely an agreement by the state to meet conditions stipulated by the federal government so as to become eligible for federal grants. It contains objectives, policy, and administrative guidelines and fiscal and other constraints. Its designation as a state plan may have led some to mistake form for substance and to conclude that satisfaction of these minimal legal requirements will substantially cover the planning that is necessary. The state's projected activities report is also required by USOE and is stated by the latter to be the "annual program plan" related to the state plan. This serves to concentrate planning and programming on resource inputs such as facilities and teachers added which at best could be designated intermediate rather than final goals. More creative leadership in planning and programming is required.

Seventh, adequate information for planning, decision-making, and program evaluation is not now available. The installation of modern automatic data processing systems is required to facilitate the collection and display of essential information for educational managers. This is required for all phases of the management cycle. Identification of the necessary data inputs is crucial, otherwise the only improvement made would be the more rapid transmission of inadequate information.

Eighth, educational institutions have been slow to apply modern technology and planning, programming, and decision-making processes and tools to the management of their programs. Formal planning organizations with full-time personnel are generally absent. Planning takes place on an ad hoc basis. Goals are specified usually in terms of the inputs, or resources that are used, such as facilities to be built, teachers to be added or trained, and students to be enrolled. It may have been useful to concentrate on facilities and other inputs while getting resources into place after passage of the Vocational Education Act of 1963, but it is now time to focus the planning processes on the final products of occupational education--the disadvantaged and other students and their placement in gainful employment and the behavioral outcomes and other goals, including life adjustment as well as vocational adjustment, that are the aims of the educational process.

Ninth, many of the professionals with the planning and analytical skills necessary to assist managers of educational institutions to achieve the multiple objectives of education in a more timely and effective manner cannot be found in the educational establishment. Professionals such as economists, systems and operations research analysts, and sociologists from outside the educational establishment can provide new approaches and expertise to solve deficiencies such as those enumerated.

Tenth, the location of the responsibility for some kind of planning, programming, and budgeting organization and system is not as important as the recognition of the need for its operational establishment. A comprehensive planning system integrating objectives and goals, planning premises, program structure, programs and their full costs, budgets, evaluation, special analytical studies, and program analyses is required at state and major community levels. It would provide valuable assistance to educational managers in accomplishing the multiple objectives of the educational process.

Finally, interdependencies are identified between academic, general and vocational education and technical, community college, and higher education. For example, the relatively fixed student population should be considered to avoid redundancy in determining facility requirements for secondary vocational schools and for comprehensive or regular high schools in a given area. Although focused directly on occupational education, the concepts and methodologies discussed herein have broader applicability and should be used in planning and decision-making at elementary, secondary, and higher education levels.

This report is respectfully submitted in the hope that it will contribute to the encouragement and better planning and programming of occupational education in the United States.

Sincerely yours,

Arnold Kotz

Arnold Kotz
Stanford Research Institute

AK:mi

Enclosure

PREFACE

Increased resources made available to vocational and technical educators at state and local levels through the passage of the Vocational Education Act of 1963 led a number of us at the U.S. Office of Education to consider the use of modern programming, planning, and decision-making concepts and techniques to assist in the wise allocation of these resources. Stanford Research Institute was commissioned by USOE to examine the planning and allocation processes for vocational and technical education in six states and eleven communities. The results were used as a basis for the development of position papers by experts from various disciplines and the preparation of statements in the following areas: identification of objectives and goals, structuring of alternative programs to achieve them, benefit/cost analysis, and projection of demand.

With the survey findings and the position papers as background, a conference was convened for the purposes of determining the problems associated with planning and programming of vocational education. Economists, vocational educators, and representatives of universities and nonprofit research institutions, together with administrators, systems analysts, and planners, met at Airlie House for this purpose. The interdisciplinary approach sparked a valuable exchange of concepts and new approaches. The research effort and the conference outcome identified many areas for improvement. The use of the reconnaissance surveys in the states and communities contributed to the uniformly high quality and relevance of the conference.

In this report, several important parts should be specifically identified. The illustrative structuring of the objectives and goals of vocational and technical education in Part II is particularly useful. Vocational and technical educators are being asked to contribute to the reduction of unemployment and social tensions through provision of education and training to the disadvantaged; to assist in the elimination of discriminatory hiring practices, through providing the essential qualifying training; and to prepare trainees to secure jobs commensurate with their abilities and interest in such a way that they will be provided with adequate earnings over an extended period.

Part III on alternative programs should be of particular interest to educators. The alternative programs or strategies discussed in this part include deferring occupational choices until postsecondary time frames; cooperative training programs, the "organic" curriculum, and trade-offs between manpower development and training programs. There are many interdependencies between vocational and technical education and academic and general education course sequences at the secondary level. Equally thoughtful are the comments on the many other programs such as housing and urban development that contribute to shared objectives with education in reducing social tension and contributing to economic growth.

The need for multiyear programs and budgets displaying the total costs of programs rather than partial costs, presented in Part IV, is one that should elicit general agreement. This is also true of the recommendation that all planning should be focused on the final outputs of the educational processes rather than resource inputs.

The usual criteria for evaluating education training is to assess the benefits derived at specifiable costs. The various authors of papers in Part V of this report emphasize the fact that both direct benefits and indirect benefits should be included in the evaluation. Remedial training and costly counseling services may not on the surface appear to be reasonable investments when recipients of such services can only qualify for low paying, entry level jobs. The benefits may be low and the costs high, but when these costs are compared with unemployment compensation costs, welfare payments, or costs of reducing juvenile delinquency, they may be relatively modest. Obviously, there are conflicts between the economic efficiency objective of optimizing the benefit/cost ratio and that of providing equality of education to the disadvantaged. Through planning, the objectives should be explicitly stated and such conflicts should be identified. Priorities should be established among competing objectives, and programs and resources should be developed and allocated for effective achievement of the multiple objectives of education. The information presented in Part V provides valuable insights into problems of this type. The discussion of the analytical techniques that should be applied to the decision-making process, including the differentiation between effectiveness/cost and benefit/cost techniques, describes new approaches that should be applied to all education programs.

Arnold Kotz and Stanford Research Institute have done an excellent job in bringing these new planning and budgeting concepts to the attention of educational administrators. It is with great pleasure that we are making this report available to vocational educators at state and local levels.

David S. Bushnell

David S. Bushnell, Director
Division of Comprehensive and
Vocational Education Research
U.S. Office of Education

September 15, 1967

ACKNOWLEDGMENTS *

The various papers by authors other than the editor, prepared for the conference at Airlie House in the spring of 1967, appear as chapters in this report with only minor editorial changes. Grant Venn helped set the tone of the conference by stating some broad objectives and philosophy that should guide vocational education. Charles Hitch stressed the value of PPB systems to education, drawing on illustrations from his large experiences in defense programs. Garth Mangum's paper and discussion raised many significant problems and identified issued for consideration by educators and manpower specialists. David Bushnell, Robert Morgan, Wilbur Landis, and Robert Worthington set forth alternative approaches that merit consideration in planning occupational education.

In the program budgeting and economic analysis areas, significant contributions were made by Bruce Davie, Thomas Fox, Robert Grosse, Einar Hardin, Robert Spiegelman, and Ernst Stromsdorfer. The papers on benefit/cost analysis, written from several perspectives, focus on vocational education and represent a unique contribution.

Thayne Robson, Sol Swerdloff, and Norman Medvin handled their assignments of outlining the current strengths and deficiencies in manpower supply and demand projections with great competence.

Marc Matland and Bernard Michael of the U.S. Office of Education were most helpful in providing insights and securing access to data used throughout the report. Stanford Research Institute is also indebted to the many conference participants and persons from state and local governments who were of invaluable assistance.

The Institute is fully responsible for the interpretations and the major conclusions and recommendations contained in Part I of this report.

---

* See Appendix A for a list of the participants in the Airlie House Conference on Vocational Education.

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PART I: INTRODUCTION AND MAJOR RECOMMENDATIONS AND CONCLUSIONS

Chapter 1

INTRODUCTION

Background

Resources consumed by the educational enterprise in the United States are substantial and are growing larger every year. These resources are designed to achieve important national objectives, such as contributing to economic growth, the continuity of our culture, the development of individual and collective capacities, and many other worthy purposes. At the same time that claims for these resources are being presented, there is a growing pressure for allocation of resources to many other objectives of our society.

The USOE has reported that total expenditures for all levels of education amounted to $45 billion in FY 1966, or approximately 6 percent of the GNP.[1] The largest proportion of the total amount, $29.9 billion, went to elementary and secondary schools. A recent National Planning Association study concerned with national objectives has estimated that expenditures for all education will almost double by 1975 to $82 billion. The National Planning Association estimates that costs for primary and secondary education will increase to $54 billion in 1972.[2]

Rising enrollments, larger faculties, increased facilities, and substantial expenditures for equipment all affirm the substantial magnitude of resources required and consumed by the education in the United States. A report of expenditures for federally aided programs of vocational-technical education for FY 1966 shows expenditures of $800 million,* with the state and local jurisdictions putting in approximately $2.50 for every dollar of federal funds. Also, it is probable that more funds were spent by state and local governments for programs not aided by the federal government. This figure compares with a total of $284 million expended for vocational education in FY 1962. Substantial increases in the amounts for vocational education, facilities for it, and enrollments and teacher staffs will occur by 1975. Testimony by representatives of the USOE concerning FY 1965 indicated that 25 percent of all secondary students were enrolled in some kind of federally aided vocational education program. They estimated that this would increase to at least 35 percent of all students enrolled in high schools by 1970. An increase of 100 percent in the number of area vocational schools and other facilities between 1965 and 1970 was projected in the same testimony.[3] In addition to expenditures on vocational education in the public schools, several billion dollars a year are allocated to manpower training programs by the federal government and private industry.

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* Preliminary data provided by USOE.

Many of the large corporations of the United States, such as IBM, Ford, Lockheed and AT&T, have established long range planning organizations with analytical capacities to ensure that the best of modern decision-making concepts and techniques are applied to the allocation of resources to optimize profits, to ensure survivability, and other major objectives. In contrast with such large corporations, government agencies have been slow to establish planning staffs and to undertake long range planning systematically. The Department of Defense is an exception to this. In 1961, it instituted a PPBS system that integrated short term budgeting with long range planning and programming. The system facilitated comparisons of alternative weapons systems, projects, and programs to achieve objectives or purposes in the most efficient manner. The time horizon for programming and budget reviews was extended from one year to five years for the purpose of displaying the full cost of a project or system rather than merely the first year's expense.

In August 1965, President Johnson directed each major federal department and agency to set up a planning and programming system similar to that installed by the Department of Defense. As indicated in the President's budget message to Congress for FY 1968:

> This system, which was initiated throughout the Executive Branch a little over a year ago, requires all agencies to:
>
> - make explicit the objectives of their programs and relate them carefully to national needs;
>
> - set out specific proposed plans of work to attain those objectives; and
>
> - analyze and compare the probable costs and benefits of these plans against those of alternative methods of accomplishing the same results.
>
> This system is primarily a means of encouraging careful and explicit analysis of federal programs. It will substantially improve our ability to decide among competing proposals for funds and to evaluate actual performance.

Reconnaissance Surveys

Commissioner Grant Venn, Dr. Walter Arnold, and Mr. David Bushnell of the USOE were concerned that modern planning, programming, and decision-making concepts and techniques were not being introduced into the management of the vocational and technical education establishments with sufficient rapidity. The USOE therefore commissioned Stanford Research Institute to examine the planning, programming, and budgeting processes in six states and eleven communities.

One state was selected to depict scenarios in which control of education is greatly centralized. Two states were selected to represent a balance between decentralized management of vocational education and central control. Another state had very strong local direction of the program. One state was selected as representing a state having a separate board of vocational education. The sixth state was selected to represent circumstances of sparse population and problems of out migration from rural to urban centers. The localities selected had to meet criteria such as being in a Standard Metropolitan Statistical Area and having substantial minority populations.

Only a few days were allowed per jurisdiction for the reconnaissance surveys. Interviewers were encouraged to collect documents such as state plans, projected activities reports, annual reports, budgets, and research reports. The survey was not concerned with counseling, teacher preparation, curriculum development, or the assessment of the learning process, although these are important. The research project focused directly on the planning, programming, and decision-making processes. It was problem- and deficiency-oriented and was not intended to document the substantial accomplishments that have been made by vocational and technical education in training and placement. It is, therefore, necessary to place the findings in a proper perspective.

Field researchers interviewed many high level executives in vocational and technical education. Federal, state, and local directors of vocational and technical education and their staffs, as well as those responsible for related manpower training programs, were most helpful in cooperating in the research effort.

It is not claimed that the diagnostic summary that follows is an accurate representation and description of all states and communities. The primary value of the findings of the reconnaissance surveys emerges from the clear indications provided in each of the states and communities as to the manner in which current planning and programming takes place as related to the aims of a modern PPB system.*

Descriptions resulting from the surveys were used as the point of departure for development of position papers by experts from universities and nonprofit institutes, from federal and state jurisdictions, and from industry. The survey results and the position papers provided the basis for discussion of major issues and new approaches to the planning and programming of occupational education by economists, occupational educators, administrators, systems analysts, industrial trainers, and planners on an interdisciplinary basis.

The surveys in the states and communities were conducted by means of interviews using a formal survey guide that was openended. Approximately one month was allowed in each state, including two communities in addition to examination of the planning, programming, budgeting, and decision-making processes at the state level. In addition to conducting the surveys in the six states and communities, many relevant documents of the U.S. Office of Education and of other states and communities were examined. The surveys and evaluations looked at existing planning, programming, and decision-making systems from the perspective of the aims of a modern PPB system.

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* The aims of PPB appear in Appendix B beginning on page 194.

Chapter 2 of Part I contains the major conclusions and recommendations resulting from the study. The chapters in Parts II through VI are organized sequentially to consider the several phases of PPB systems, from the establishment of objectives and goals to the evaluation of progress toward their attainment. The first chapter in each part has been prepared by the editor and describes the reconnaissance survey findings and the research effort.

Chapter 2

MAJOR RECOMMENDATIONS AND CONCLUSIONS

Recommendations

Organization for Planning

1. The basic concepts of and new approaches to decision theory and PPB (planning, programming, and budgeting) on a systematic basis, as recommended in this report, should be adopted and installed by all governmental jurisdictions having a major responsibility for the allocation of resources for occupational education (F,S,L).[*]

2. Planning organizations and staffs should be established at state and major community levels to assist the superintendent of instruction, the director of occupational education, and other educational managers responsible for the allocation of resources to educational programs (S,L).

3. Provision should be made for exchange of personnel among the federal government, states, and communities to facilitate translation of the new concepts in planning into actuality with greater rapidity (F,S,L).

4. A training institute should be established in the Washington, D.C., area, responsive to the USOE (U.S. Office of Education), to train appropriate personnel from federal, state, and local jurisdictions in the PPB and decision-theory systems approach to education. The curriculum would include concepts, methodologies, and practical applications of the systems approach to occupational education. It would also cover such topics as the relation of supply of qualified manpower to demand for specified regional areas, as well as training in the techniques required to determine the advantages and disadvantages of alternative programs to achieve the objectives and goals of vocational education. The curriculum would also include the results of research studies, demonstration and experimental projects, benefit/cost analysis, and case studies conducted in the educational sector

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[*] F,S,L indicate recommendations that pertain to federal, state or local levels. Underlining indicates level of primary action.

of the economy. The USOE should take the lead in establishing such a training program for planning and programming vocational education (F,S,L).

5. The Vocational Education Act of 1963 should be amended to provide authorization and funds to strengthen state and local jurisdictions in the establishment of modern decision-making and planning systems for occupational education (F).

6. Title V of the Elementary and Secondary Act of 1965 should be amended to provide for the establishment of modern decision-making and planning systems at both state and local levels with an adequate amount of funds authorized and appropriated (F).

7. PPB systems organization and staff should be established to provide comprehensive planning for both secondary and postsecondary education, broadly conceived and including their interdependencies with occupational education. Where postsecondary education has a separate jurisdiction from that for secondary education, separate planning staffs should be established for postsecondary education below the professional level; however, at some level within the state or locality, provision for coordination of their activities should be made (S,L).

8. Funds should be authorized and appropriated to provide for the training of state and local personnel in PPB at universities and in specialized training programs to develop a supply of trained personnel in this area more rapidly (F,S,L).

9. The USOE should develop and issue guidance to the states and communities to assist them in establishing and conducting PPB systems (F).

Objectives and Goals

1. Major objectives should be clearly identified, and priorities for them should be established as a guide to program development and allocation of resources at the state and community levels. An illustrative list appears in Table II-1 in Part II, suggesting a preliminary approach to the development of objectives to serve as the basis of the planning and programming process. The pertinent educational programs encompassing activities that contribute to the same objectives may then be grouped into categories to facilitate the development of alternative programs (and their resource requirements) to achieve particular objectives (F,S,L).

2. Goals should be stated in quantitative terms and represent the final purposes of the occupational educational process. Illustrative of goals stated in such terms could be the number and percent of college-bound students who should graduate from secondary schools with academic diplomas. Output goals could also

be stated in such quantitative terms as the number and percent of fully qualified students to be graduated from specific occupational course sequences and placed in jobs. Progress toward attaining the goals should be measured (F,S,L).

3. The objectives and goals should be published in a multiyear state plan and in a similar document prepared at the local level (S,L).

4. The USOE should develop guidance for the states on the development of a meaningful state plan. Such revised instructions should set forth approaches to the PPB process, including the approach to developing realistic objectives and goals with illustrative concepts, assumptions, and format. Such guidance should recognize the realities of federal, state, and local relationships in educational activities (F).

5. The states should provide similar guidance to local communities. The state plan should comprise material submitted by the communities and approved by the state and objectives, goals, and proposed programs of the state (S).

6. In the guidance provided by the federal government to the states and by the states to the communities, basic assumptions and planning premises should be set forth, as well as pertinent facts and statistics (F,S).

Alternative Programs

1. Public occupational educational programs should be required to meet tests of economic efficiency, and alternative methods of achieving the objectives and goals of occupational education should be clearly identified. Resource requirements and their costs should be directly related to each program alternative, and the benefits and costs, as well as all other advantages and disadvantages, should be arrayed to facilitate the choice among the alternatives by educational managers. When exceptions are to be made on sociopolitical grounds or for any other reason, they should be clearly identified and justified separately (S,L).
    a. Programs funded by the Vocational Education Act of 1963 should be required to meet tests of economic efficiency. Analytical studies should be conducted of alternative ways of achieving objectives and goals, using benefit/cost and systems analysis techniques (F,S,L).

    b. Some public manpower training programs are funded through the Department of Labor, the Office of Economic Opportunity, and other federal agencies. At the state and local levels, counterpart agencies other than the public school systems may have jurisdiction. Comparative evaluation and benefit/cost studies should be conducted through interagency agreements across organizational lines to determine the best programs or approaches to achieve mutually shared objectives and goals (F,S,L).

    c. It will be difficult to conduct comparative evaluations of alternative programs for achieving the objectives when some of the programs are under the jurisdiction of proprietary schools, industrial firms, or other private bodies. However, efforts should be made to obtain agreement on the conduct of such studies, in view of the importance of reducing unemployment and social tension, contributing to economic growth, and other significant purposes that are shared by all elements of society, including the business community. In some cases, it will be evident that programs can be conducted at less cost to the school system by the private sector without the need for studies in depth. But where net national economic advantage is concerned, more comprehensive analysis would be required (F,S,L).

2. Since personnel and resources to conduct the analytical studies will be limited, priorities should be established for the conduct of such evaluations as part of the overall plan for occupational education in each state and community. Many studies will generate useful findings and conclusions that can be used in other jurisdictions. Methods should be found to transfer technology and avoid unnecessary duplication of studies (F,S,L).

3. The USOE should accelerate the transfer of technology by making available the results of analytical studies--including concepts, assumptions, and methodologies--to all jurisdictions. This function should not be limited to mechanical dissemination, but should include stimulating change and implementing of promising new concepts and technology (F).

Program Structure and Budgeting

1. All states and communities should design and establish program structures and budgets to ensure effective integration of programming and budgeting (S,L).

2. State and community plans should be revised to show multiyear programs and budgets and to focus on the final goals to be attained. The long range, multiyear programs and financial plans should cut across organizational lines (S,L).

3. A scheduled annual planning cycle should be established and adhered to that will integrate programming with budget formation and review through the use of the common program structure and program elements. Educational managers should integrate their budget requests to the legislature for annual or biennial funds with the long range planning (S,L).

Benefit/Cost and Effectiveness/Cost Analyses

1. All programs to achieve explicitly defined objectives and goals of occupational education should be subjected to benefit/cost and effectiveness/cost analyses. Research plans should be developed at each appropriate governmental level, establishing the priorities in order of importance for the studies to be conducted and their relationship to the achievement of objectives and goals. Funds should be allocated to the projects in accordance with the established priorities (F,S,L).

2. The USOE should provide for the collection of information with respect to projects under way or completed in this area and for the prompt dissemination of results to the field (F).

3. The USOE or some other federal agency should develop concepts, criteria, and methodology to guide investments in human resources development projects. The USOE should take the lead in the establishment of such guidance (F).

Manpower Demand and Supply

1. The quality of manpower projections for use in planning at the state and local levels should be improved. For this purpose, joint concepts, methodology, and shared funding arrangements are required among the relevant agencies at national, state, and local levels (F,S,L).

2. Manpower skill surveys, including total requirements as well as job vacancy data, should be developed for every major metropolitan area, on a statewide basis, and on a regional basis. These surveys should project requirements at least for five years and should be kept current and adjusted on an annual basis. The projections should be set forth with the specificity required for effective use by vocational educators in their program planning. Assumptions used in developing a projection should be explicitly stated. Consideration should be given to the practicality and desirability of presenting high, low, and in-between projections based on different assumptions as to economic and other trends (F,S,L)

3. The Department of Labor, as the technical economic agency responsible for projections of job requirements, should issue guidance to the field on how to conduct such studies of job demand, pursuant to general authorization of an interagency group established for this purpose to ensure that the several needs for these kind of data are met, including: (a) education and training, (b) counseling and referral, (c) placement, (d) indicators of trends in the economy, and (e) mobility of manpower to adjust to demand. Improved methodologies for the projection of occupational demand must be developed to meet these needs more adequately (F).

4. A systematic inventory of supply should be conducted in every major metropolitan area, state, and region. This inventory should include people working or looking for work, as well as persons in training in the various pipelines, including public schools, proprietary schools, religious schools, manpower training programs, and on-the-job training industry. The development of such inventories of supply should be conducted following interagency agreement. Regardless of the location of the responsibility for the conduct of such inventories, it is essential that they be responsive to the requirements of the agencies concerned (F,S,L).

5. More resources in manpower and funds should be made available for the development of projections of demand and supply of manpower on a statewide, regional, and metropolitan basis (F,S,L).

Evaluation

1. Evaluations should be conducted at state and major community levels to measure progress toward the final goals of occupational education, which should be output-oriented as set forth in this report. Evaluation systems should be refashioned so that they facilitate measuring performance in a timely fashion. They should also provide feedback to enable recycling of the management cycle and programs where deviations or major problems are uncovered (S,L).

2. An information system should be designed to collect the requisite data required for the conduct of such evaluations (F,S,L).

3. The USOE should issue guides to the states and communities on how such evaluations should be conducted. Guides should include basic concepts, assumptions, criteria for conduct of the evaluations, and methodologies. Minimal data needed by the USOE should be described in the guides (F).

4. The USOE should also issue guides on the national requirements for an integrated data reporting system for occupational education (F).

5. Adequate funds and resources should be provided for the USOE evaluation staff to conduct high priority evaluations and studies of occupational education for the purpose of identifying deficiencies or lack of progress, suggesting new directions in existing programs, or proposing entirely new innovative approaches. The USOE should provide for more rapid transmission to the states and communities of the results of research conducted under the sponsorship of the Bureau of Research, USOE, as well as other pertinent research results. USOE should develop new approaches and use all media effectively for the transfer of technology and the implementation of research findings and recommendations where appropriate. Such funds and resources are necessary if the USOE is to provide the appropriate leadership in nationwide occupational eduction (F).

Conclusions

Introduction

PPB systems can and should be applied to problems of occupational education at federal, state, and local levels. PPBS can assist high level managers in arriving at more rational decisions with respect to allocations of resources to achieve the broad objectives and specific goals of education. PPBS relies heavily on systems analysis, which is concerned with the comparison of different programs or means to achieve objectives and goals, where the programs constitute a number of components or elements that should be evaluated in totality. It uses an interdisciplinary approach, of which economic analysis is an important part. Systems analysis is primarily a tool of quantitative analysis concerned with basic problems of how to obtain optimum results from inputs of scarce or limited resources--whether they are financial, materiel, facilities, or manpower resources.

Systems analysis can never replace the decision-maker or make the decision for him. Benefit/cost analysis is at its best when used in pursuit of economic efficiency objectives as listed in Table II-1 of this report. Since occupational education is concerned primarily with preparing students for gainful employment, rational economic analysis obviously has a great deal to contribute. Because of the highly charged political and social environment in which education takes place and because of the multiple objectives pursued by the education and training process, the relevance of economic analysis is less dominant in the pursuit of some of the other objectives listed, such as reduction of social tension, provision for continuity of our cultural heritage, and increased participation in citizenship and the democratic process. In fact, some of these objectives conflict in their claims on resources with economic efficiency objectives. In this area, systems analysis with its interdisciplinary team can make a real contribution. Pursuit of the objectives of reduction of social tensions may call for allocation of more resources (in absolute or percentage terms) to training persons from the disadvantaged areas with minimal motivation and achievement levels and less for the training of academic students with high motivation. In the quantitative analyses comparing these alternatives, one cannot determine the total dollar benefits that would result from the reduction of social tension generally--or the portion contributed by occupational education.* In this case, effectiveness/cost analyses may be more appropriate. Obviously, there are areas where the decision-makers, both in the executive and legislative branches of the government, must use their best political judgment and in some cases their best intuitive judgment. Frequently, survivability of the managerial group will dictate supporting one course of action to obtain political support or retaining it, even when benefit/cost or effectiveness/cost analyses might recommend an alternative approach. This is appropriate when considering investment or allocation decisions in the public sector through the democratic processes, as distinguished from practices in the private economy. Even within the constraints set by the sociopolitical environment, the decision-maker may find that various options remain open to him. Educational managers will be better able to arrive at and defend rational decisions if they place greater reliance on systematic, quantitative analysis than has been the case up to now.

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* Economic analysis can make some contributions to the achievements of this objective. Measurements already have been made of the income levels of those in the poverty subculture. It is also possible to measure their housing and living situations in relationship to norms that could be established and to provide some measure of anticipations and demands of those in the poverty group in relationship to actual and normative conditions. It is quite possible that a study could be made of the economics of social unrest with indicators measuring

The reconnaissance surveys identified many deficiencies in the decision-making process that result from the absence of an integrated PPB system. Although many components of a sound planning system were found in each of the jurisdictions surveyed, the lack of an overall design and of an integration of the component parts resulted in the type of deficiencies described. It should be kept in mind that the tools for a modern planning and decision-making system, although evolved over many years in specific jurisdictions, particularly at the federal level, have not been applied to many civilian programs in the public service. The evaluation of vocational education from the criteria of the presence or absence of a modern PPB system (the current brand name in the public service for decision-making systems) to assist educational decision-makers is, therefore, deficiency-oriented. The research requested by the USOE was not designed to document the substantial contributions of vocational educators at state and local levels in the training and placement of thousands of youngsters and adults in jobs throughout the country. It is, therefore, appropriate to point out that the deficiencies described focus directly on the decision-making process from the perspective of economic and systems analysis.

Objectives and Goals

Objectives are the basis for the entire planning and decision-making process. It is the purpose of education, including vocational and technical education, to accomplish certain specified objectives. Clear, systematic formation of these objectives is essential to focus resources and energies directly on achieving defined purposes. The search for alternative programs or courses of action to achieve the objectives, the choice of the optimum or preferred programs based on display of data presenting the benefits and costs of alternatives, the ranking of priorities among

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critical thresholds of unemployment and underemployment, housing and congestion, income, consumer-type problems, and lack of parity of the disadvantaged in terms of the political structure, police-community relations, the power structure, etc. Stanford Research Institute has already initiated development work exploring some aspects of this problem.

them, and the measurement of progress all should proceed in logical, systematic sequence.

Review of the legislative background of the Vocational Education Act of 1963 and the Act itself demonstrated that Congress did not establish the relative importance of the several objectives and goals listed, or priorities for them. The President's message of 1967 on "Education and Health in America" stated objectives for education, including training the disadvantaged, ending discrimination, reducing unemployment, and improving training for the world of work. Much of the legislation initiated by the Executive Branch, such as the Vocational Education Act of 1963, the Manpower and Development Training Act, portions of the Elementary and Secondary Education Act, the Economic Opportunity Act (Projects Headstart, the Neighborhood Youth Centers, etc.) is designed to help the disadvantaged overcome the burdens of poverty and participate more fully in the mainstream of economic and social life through education and training. However, no guidance was provided as to the relative importance of the multiple objectives of vocational education or the priorities to be placed on them.

Although Congress establishes fiscal constraints and procedures that must be followed by the states in the use of federal funds, these allow considerable discretion in the establishment of objectives and goals by state and local jurisdictions. The President in his message on education and health in America to the Congress pointed out that the federal role in education is as a partner; the senior partners, with the cutting edge of responsibility for the direction and conduct of educational programs, are the states and local school districts. He pointed out that federal funds for vocational education are administered through state plans controlled by state and not federal officials.

The states and communities clearly have the responsibility for the overall management of the educational function, within the framework of federal, state, and local relations. Federal grants impose only minimal conditions on the states for vocational education. One such requirement is that each state must submit a plan for vocational education, in compliance with federal requirements, set forth by the USOE, to gain eligibility under the Vocational Education Act of 1963. The state plan describes the state's vocational education programs and must be submitted and approved by the Commissioner as a condition for the allotment of federal funds. Although it facilitates the planning process, the state plan is neither an annual plan of action nor an intermediate or long-range plan. Although it states some of the objectives and goals of state vocational education, the state plan is not an overall planning document that directly and systematically relates existing programs or proposed programs to the objectives and goals that have been established. Methods or criteria to ensure that such statements of the overall state objectives are realistic or operational are generally absent.

The states and local communities surveyed have not formally identified their overall vocational educational objectives and goals in a systematic and meaningful manner as part of a logical planning system. Their statements of objectives and goals appear in many documents such as the state plan and occupational syllabi such as for business education or technical education. They are mixed with planning premises; exhortations; policy, procedural, and administrative guidelines; and funding constraints and prescriptions. The development of objectives and goals has not been subjected to the discipline of the systems approach that would require, among other things, that alternative programs and their resource requirements be directly related to them, priorities of importance be established for them to guide allocation decisions, potential or actual inconsistencies or conflict among them (if all were to be pursued simultaneously) be identified and related to resource constraints, economic analysis be made of the benefits and costs of alternative programs to assist decision-makers in choosing among them, and that goals be set in quantitative form and measurement be made of progress toward their attainment. Such formal structuring would facilitate the development of programs to accommodate several objectives concurrently. Resources are limited so that in reality all objectives and programs cannot be pursued or achieved simultaneously. It is essential that judgments be made as to the relative importance of objectives, goals, and programs so that priorities may be established to guide allocation of resources. For example, a specific vocational program, one for home economics, may further one objective but may be conducted at the expense of another (e.g., the objective of making a person a good homemaker may conflict with another that would provide gainful employment to the student).

A useful distinction between objectives and goals has been introduced into the literature on long range planning. Objectives are those general purposes pursued over a long period and usually not quantified. Goals are set for specific, shorter time frames and are usually quantified. Goals for education can be stated in terms of the number or percent of all students who should complete secondary school for 1968 or 1969 with academic degrees compared with the number or percent of those who should be equipped with skills necessary for placement in gainful employment. Alternative programs can then be structured to achieve the goals (whether through academic programs, manpower training programs, or secondary vocational schools), economic analysis can assist in choice of the best manner of achieving the goals, and progress toward their attainment can be measured.

Neither the states nor the local jurisdictions surveyed make such distinctions between objectives and goals. The absence of such a distinction results in many objectives that do not have goals specified for them. Some goals have been quantified, but these are usually resource inputs or intermediate goals (such as facilities built or teachers added) rather than the final outputs or goals of the vocational educational process, such as students graduated and placed in gainful employment. Strategies or priorities are not established for the goals, or the subset of goals to be attained even where goals are specified. Presumably, all the goals are pursued simultaneously with equal intensity of effort and resources, which is not feasible.

The USOE reported that high school graduates in 1965-66 represented 77 percent of the class that entered the 9th grade four years earlier, compared with 69 percent of the 9th grade class of 1957-58 graduated in

1960-61. These data represent averages from which there would be wide variation among the various states and communities. Setting goals in terms of the number and percent of high school graduates of a school system from academic programs or comprehensive high school programs with specified achievement levels would affect the setting of goals for graduates of secondary vocational schools. It would also affect the setting of goals for those students who could not complete secondary school with a diploma and were being prepared for direct entry into the world of work. The interdependencies of alternative programs to achieve specified objectives should be carefully recognized in goal setting.

Alternative Programs

One of the most critical and most creative parts of the planning process is the need to identify alternative courses of action or strategies to achieve the objectives and goals. It is at this point that the application of analytical techniques are carried out through broad systems analysis in which alternatives may be compared with respect to both their benefits and their costs. These should be carefully quantified. Those elements of the problem that cannot be quantified should be explicitly stated. The evaluations should identify for the decision-maker the course of action that will yield the greatest effectiveness for a given cost (e.g., the number of students graduated or placed in jobs) or a specified degree of effectiveness for the least cost, thereby assisting him in more effective use of limited educational resources.

The surveys conducted in the selected states and communities reflected general recognition of the alternative means to achieve stated objectives and goals. However, with few exceptions, there was no attempt at systematic analysis of the alternative means. No benefit/cost analyses or effectiveness/cost analyses comparing alternative means were being conducted in any jurisdiction. A few studies (identified in Part IV) dealing specifically with benefit/cost analysis, were being conducted with federal or Ford Foundation funds.

Educational philosophies have long been concerned with an alleged conflict between general education and vocational education. This is currently a major issue at the secondary school level in many state and local jurisdictions. Basic intellectual faculties are concerned with the general skills that have been advocated by many as the broad base of knowledge essential for fullest development of the individual through adolescence and that may lead to employment. Vocational and technical education, however, has an additional thrust, emphasizing the need to equip the youth with the skills and competencies necessary for immediate gainful employment. Should vocational training focusing on job commitments be preferred to general education? The research found sharp awareness of the conceptual differences between these two approaches among the states and communities, but little knowledge or applications of economic or systems analysis to help educational managers to determine the advantages or disadvantages of different approaches.

Alternative approaches are offered through separate area vocational schools and comprehensive high schools that combine academic, general, and vocational programs. Strong arguments have been made for separate vocational schools at the secondary level to provide training for the world of work for the large numbers of dropouts and the substantial number of high school students who do not go to college. A higher retention of dropouts is claimed for vocational education through this approach than through the use of comprehensive schools. The secondary area vocational schools could offer a wide diversity of courses to meet objectives and goals, as well as economies in the use of faculty, facilities, and equipment. In addition, some students would prefer area vocational schools.

Strong arguments have also been advanced that changes in the world of work require that all students be offered broader-based training that would contribute to effective performance in a wide variety of jobs in related occupational families. The comprehensive high schools would provide occupational training without segregation of vocational students. In addition, the comprehensive school may permit freer movement of students between general and vocational programs. There is no intention to show preferences among these alternatives. Research to date has been unable to provide a definitive answer as to the relative value of the comprehensive school compared with the area school.

The problems raised in such a conflict should be subjected to an analytical approach establishing objectives and goals, required facility capacity compared with demand, and explicit benefits and costs. Decisions among such alternatives would be facilitated if educational managers were to focus on the final outcomes of the educational process rather than intermediate goals. The jurisdiction that set a goal of blanketing the state with secondary area vocational schools having occupational competence of students as the outcome, did not develop its objectives and goals in terms of the absolute number of students it aimed to have attend those schools as balanced with capacity and attendance at comprehensive or regular high schools.

Most of the alternative programs described in this chapter have been in existence for some time. However, the design of new programs to fit the objectives of occupational education is one of the most creative parts of the planning process and it is appropriate to consider at least one innovative departure. The educational system for the semesters discussed in this report suggests a redesign of the comprehensive high school curriculum to integrate academic work with occupational training using a systems approach. The curriculum would be learner-oriented rather than teacher- or subject-matter centered. The integration and interaction of components will be the result of careful systems design. The graduate from this integrated program could enter a university or a community college and pursue an academic program. He could enter a technical school and receive specialized occupational training. He would also be equipped with occupational skills to permit him to go to work at an entry level job with a sufficiently broad base of training to permit him to move up the career ladder. Although all students would be exposed to academic subjects and occupational education, the student's program would be tailored to his abilities and aspirations.

There are many alternative programs currently under way to achieve the objectives and goals of occupational education. Programs funded under the Vocational Education Act of 1963, the Manpower Development and Training Act, and the Economic Opportunity Act share many objectives in common. Some manpower training programs are geared to equip individuals with the skills to obtain employment as soon as possible. Other programs provided through vocational and technical education are designed to provide a broader-based education to equip an individual for more effective long range adjustment to the changing labor market and to meet some of the additional objectives of occupational education. The programs are administered by different federal agencies and may employ separate channels and resources for the conduct of their programs.

Vocational education pursues the broader-based educational purposes described above, but it also provides shorter training programs designed to meet the immediate needs of potential dropouts and others for early employment. Manpower training programs frequently identifies remedial training needs for reading, comprehension, and computational skills and extends its training from narrow job orientation to broader-based training approaches. Although these programs have been under way for many years in the several states and communities, comprehensive comparative analytical evaluations of target groups, advantages and disadvantages, benefits, effectiveness, and costs have not been performed. Since hundreds of millions of dollars are spent each year on these programs, the lack of such systematic evaluations represents a deficiency that should be remedied. Educational and manpower training managers cannot be sure that they are allocating resources wisely in the absence of explicit data depicting benefits and costs of the alternatives available to them.

Individuals with the skills necessary for employment are trained through many sources. These include publicly financed educational and training programs, proprietary schools, and training in industry. Where the demand is large and not currently being filled, the diversity of approaches may not raise substantial barriers to the efficient allocation of resources. However, consideration should be given to the benefits and costs of alternative ways of achieving goals. Some equipment for training programs is large and expensive and needs facilities to house it. Also, technological changes may increase the rapidity with which such equipment becomes obsolete. A private firm must purchase and house such equipment to compete in the market place. It therefore could prove a less costly burden on public funds to use cooperative programs where the broader-based training is provided in public institutions, and training to meet the particular job requirements is conducted by the private firm. Benefit/cost or effectiveness/cost analysis of alternative programs of this type was not being conducted in any of the states or communities surveyed.

An obvious area for development of alternative strategies is the determination of program emphasis and priorities for the occupational categories and courses offered in the public school systems in relation to current and prospective demands. The survey found that critical needs of the states and communities for personnel qualified to perform work in certain occupations were not being met, while substantial effort was going into training people in home economics and other areas with less urgent requirements. The major occupational offerings such as agriculture, home economics, health occupations, and technical occupations, compete for limited resources, and therefore priorities should be established for them as a basis for making allocation decisions. Similar analysis is required for comparison of training emphasis among particular jobs or job families within an occupational category, in relation to demand or other established criteria. Such analysis is now generally absent.

Recent innovations in educational technology and the determination of their utility and effectiveness and their acceptance and installation by school systems should be analyzed. For example, the Department of Defense conducts many occupational training programs using some of the newer techniques. The possibility of transferring technology from the DOD to civilian institutions should be investigated in relation to behavioral outcomes and benefit/cost analysis. Adoption of the systems approach to planning would ensure the application of appropriate analytical techniques in evaluating the merits and suitability of the new technology.

Many programs share objectives with occupational education but are designed to achieve their goals through means other than formal training programs. Some of these programs are designed, for example, to achieve the objective of reducing unemployment by increasing aggregate demand, thus creating more jobs, or by allocating funds for creating service-type jobs in the public sector. Other programs may be designed to increase the income of the disadvantaged through welfare, unemployment insurance, and other transfer payments in lieu of job creation or training. Programs for guaranteed annual income and negative income taxes are currently under discussion and may be considered alternative ways to help achieve objectives and goals. However, the decisions with respect to such alternatives are not those of the educational managers to make, and are therefore excluded from consideration in this report.

Program Structure and Budgeting

A few states and communities have initiated actions to install PPB systems for vocational education, such as Pennsylvania, New Jersey, and New York City. Aside from these encouraging beginnings, the surveys disclosed inadequate integration between the substantive programming of vocational education and the fiscal planning at state and local levels.

Programming and budgeting were both "incremental" in nature, proceeding from the base of the prior year.

The programming structure was oriented toward intermediate goals or inputs, such as construction of facilities, addition of teachers, and training of enrollees, rather than being directed toward the final outputs or goals--the graduates of particular programs and their placement in jobs. Priorities were not established for approved programs to facilitate choice and guide budget and allocation decisions.

With the exception of facilities, programs and budgets were projected only for one or two years. As a consequence, the total costs of programs were not available to decision-makers. No budgets focused on such resource inputs as manpower costs, transportation, utilities, and materiel and were not directly related to the program structure.

The need for development of program structures and related budgets to focus management attention on output-oriented goals and to provide for better data collection at all levels was recognized by many personnel in the USOE. However, USOE has not developed and disseminated any material to guide state and local communities in this area.

Benefit/Cost and Effectiveness/Cost Analyses

It is in the selection of alternative ways to achieve the objectives and goals of occupational education by decision-makers that benefit/cost analysis, effectiveness/cost analysis, operations research, and other quantitative tools can make their greatest contributions.

If resources were unlimited, educational objectives and goals could be pursued simultaneously without establishing priorities for them or decisions to pursue some programs actively, while inhibiting others. Since resources, whether in dollar terms or in manpower, are limited, it is essential to find the most efficient means of achieving stated goals.

Systems analysis is designed to help decision-makers maximize benefits for a given level of costs or to minimize costs for a given level of benefits. It includes techniques of benefit/cost analysis, effectiveness/cost analysis, operations research, and others applicable to the planning and decision-making process. Benefit/cost analysis is concerned with monetary indices, while effectiveness/cost analysis can use monetary or nonmonetary indices of performance, such as the number of graduates placed in jobs or student scholastic achievement scores. The application of these techniques of systems analysis to occupational education and other investments in human resources is a relatively new area of research. The reconnaissance surveys found that its use by educators and other professionals concerned with occupational education is practically nonexistent. No benefit/cost or effectiveness/cost analysis is being conducted by any of the states or communities surveyed, and only a few had any intentions of conducting such economic analysis in the future.

Educators have stated numerous objectives and goals for occupational education. Numerous alternative programs for their achievement are currently under way, and others are constantly being devised. As discussed earlier, there is substantial competition among these programs for scarce resources. Since some of these programs are substitute for each other, greater educational benefits may be gained by shifting resources from one type of program to another. However, in the absence of benefit/cost or effectiveness/cost analysis to guide decision-makers, all programs appear to be sheltered from the scrutiny required to obtain maximum benefits to society and to the individual.

The few benefit/cost analyses being performed to date on vocational education suffer from a lack of adequate data and methodological shortcomings. In developing benefit/cost ratios, it is essential that all components of benefits and costs be identified and included in the analysis. The details of technical considerations in the conduct of benefit/cost analyses are elaborated on in Part V of this report.

Analytical studies can be conducted independently of an integrated PPBS system; however, optimum results can be obtained if the studies are conducted as an integral part of a comprehensive PPBS system. Their conduct requires explicit development of the appropriate criteria and right questions, clear knowledge of objectives and goals for programs that are to be compared for their advantages and disadvantages, and a sound data base to provide essential inputs to the analysis.

The surveys found that many of the data necessary to conduct effectiveness/cost analyses are largely absent at the national level. Much of the information coming into the USOE reflects so high a level of aggregation that it becomes almost meaningless for analytical purposes. For example, much of the information on enrollment accumulates data on individuals, without distinguishing whether they attend on a full-time or a part-time basis. Much of the information is input rather than output-oriented and does not focus on individuals placed in jobs or their earning streams. This makes the conduct of analytical studies measuring the worth of vocational education very difficult. The surveys indicated that more data are available at community levels than at state or national levels but even at the community level, they are not adequate or being structured for use in benefit/cost analysis or for facilitating an improved planning and decision-making system.

It would not be necessary for all jurisdictions in a state or for all states to conduct replicating analytical studies. Studies conducted in one jurisdiction should be made available to others. Because of the many problems that should be subjected to intensive analysis, a plan for research should be set forth at the state and local levels with priorities assigned for the studies to be undertaken. Arrangements should be made at state and national levels to ensure rapid communications of the results of such studies to all concerned jurisdictions.

The systems analyst cannot substitute for the decision-maker, but assists him by displaying the full costs and the advantages and disadvantages of alternative courses of action, although the final decision may be made on other than economic efficiency grounds. Ratios of benefits and costs should not be compared for two or more programs for decision-making purposes unless their commensurability has been established. (An inappropriate comparison for this purpose may be that of cancer reduction programs with vocational education.) All benefits and all costs should be included in the measurement. While benefit/cost analysis can best measure achievement of the economic efficiency objective, there are additional objectives for vocational education, and effectiveness/cost measurements may be more appropriate for the latter. Performance on standardized tests may best measure performance in terms of behavioral outcomes as goals in relation to the efficiency of the learning process. Effectiveness in the objective of reducing social tensions could be quantified in terms of reduction in unemployment, size of income, and so on. After measuring all those portions of goal achievement that can be quantified, one must describe qualitatively those that cannot. There is a tendency to place too great a weight on those that cannot. There is a tendency to place too great a weight on those portions of the analysis that have been quantified, and decision-makers must guard against this. Further, many programs (e.g., those for job creation, provision of low cost housing, transfer payments, and civil rights) share mutual objectives and goals with education and training, making measurement more difficult.

An economic guide for the evaluation of human resources development programs, including education and manpower training, could be useful to the states and communities. Such a guide was prepared and issued for federal government investment in water resources projects. The guide should include basic concepts, criteria, and methodologies. It should provide guidance on time horizons, the appropriate interest rate, the components of benefits and costs, how risk and uncertainty should be accommodated, treatment of multiple purpose projects and of joint and support costs, and other basic issues.

Manpower Demand and Supply

The economic analysis of manpower demand and supply, including projections and their validity, is of great importance to vocational educators. The factors that most critically affect occupational education include the interests of and the choice exercised by students; the manpower demands of the nation in both the public and private sectors; the existing supply of manpower and its characteristics, including adaptability; and the political and legislative environment, including legal and financial constraints in which the school systems operate. The current and prospective economic environment introduces significant considerations. The growth, stability, or decline of particular industries has direct effect on the demand and supply for manpower. Among other labor market considerations, the educator must be concerned with trends in employment by occupational categories and by job family, skill requirements, the relationship between filled jobs and job vacancies as forecast for the state or major metropolitan area, and the size of the existing work force to meet that demand.

The determination of demand is a type of economic analysis that has had a longer history of application to vocational education than that of benefit/cost analysis. The surveys found that although many studies of demand were being conducted by the employment service, state labor departments, and by advisory committees to vocational educators, there are many deficiencies that need to be corrected.

Area skill surveys, although useful, are not conducted in a sufficient number of the major metropolitan areas or of the states. They are not timely, they are not kept current, and they do not project far enough into the future. Also, they do not provide vocational educators with the information they require about jobs or job clusters or the specific knowledges, skills, abilities, and other qualifications required.

Surveys conducted by advisory committees have varying degrees of usefulness to vocational educators in different jurisdictions. Even though they lack sophistication of methodology and have many deficiencies, on frequent occasions they have been most useful in helping vocational educators in identifying job vacancies and job demand, in the design of curricula, and in the placement of students.

There is now agreement between the Departments of Labor and Education at national and state levels to the effect that the former will provide essential job requirements data to the latter. At the state and local level, we are still woefully short of having the kind of data necessary. The agreements at national and state levels require joint concepts and methodology, work programs with established priorities, and shared funding arrangements if more rapid and effective progress toward the goals is to be attained. A promising beginning toward such interagency coordination is represented in the Cooperative National-State Development Plan, established under direction of the U.S. Department of Labor. Assessment of this encouraging development was not within the scope of this research

No studies are made of total supply coming out of such pipelines as proprietary or religious schools, manpower development and training, vocational and technical education, on-the-job training, and other sources. Also, no responsibility is assigned or recognized at state and community levels for summation and evaluation of total supply as related to total demand. Section 106 of the Manpower Development and Training Act of 1962 assigns this responsibility to the Secretary of Labor at the federal level. The identification of current supply and its relation to demand is one of the prime factors for consideration in planning program offerings and setting priorities for course offerings in relation to the objectives of education.

Many of the significant problems in this area have been recognized by the professionals in the field, but the number of qualified persons able to focus sharply on their solution is limited. Resources and efforts of the agencies primarily concerned require better direction and coordination than they currently have.

In relating supply to demand, perhaps too much emphasis is given to the demand side of the equation. Consideration should be given to more effective utilization of available manpower with its existing skills and its adaptation through short training programs. For example, unfilled requirements for professional skills of engineers, educators, or counselors could be met by development of subprofessionals. Similarly, other creative and adaptive approaches could be taken that could result in the broader-based type of training discussed earlier, ensuring the availability of a flexible work force that could be trained for changes in the world of work in relatively short time frames.

No systematic inventory of supply is conducted. When the area skill surveys are made, each reporting establishment identifies the number of workers in each occupational specialty. There is also an indication of the number needed for expansion purposes and the number needed for replacement. There is usually an indication of whether training is in the public schools or in the proprietary schools. In some instances, on-the-job training may be shown, although in one technical training survey this was specifically excluded by design. The number of people reported in an occupation does not necessarily represent the full supply of the skill. There may be other people either underemployed in other jobs with different titles or fully employed in entirely different occupations who could be part of the supply for a particular occupational family. If appropriate studies were conducted of job specifications and worker characteristics, it is quite possible that the skills of the current work force would provide some portion of the additional supply of qualified workers through transfers, promotions, and upgrading actions. Although this could contribute to turnover rates in the short run, it would open up more jobs farther down the career ladder for those with less training or skills. None of these possibilities have really been explored in terms of an inventory of supply of trained workers. It appears that substantial additional research work would be useful here.

Evaluation

Evaluation is concerned with how well an enterprise or institution performs as measured against the plan, the program, and established objectives and goals. It is an important part of the planning process, since it provides continuous feedback to spur remedial action when deviations from the plan occur; to achieve the plan; or to revise, adjust, or recycle the plan. The effective performance of this function requires staff capable of performing qualitative and quantitative analytical studies.

This research report represents an evaluation of the decision-making and PPB systems for vocational education. However, the concern in this section is more limited, since we are focusing on how effectively federal, state, and local communities conduct evaluations of their own programs. The failure of the states and local jurisdictions to relate specific programs explicitly to their objectives and to establish final outputs or goals for their programs has made the job of evaluation exceedingly difficult. Programs were not compared to determine whether alternative approaches to achieve goals could have been followed with less costs or more substantial results.

Information on graduates of particular occupational course sequences and their earning streams is needed for the conduct of much of the analysis described in this report to help choose those programs that will optimize returns to the society and the individual.

Information is not available to determine actual or prospective lifetime earnings of graduates from vocational schools or whether the occupational courses taken represent a good return on the investment.

In some jurisdictions, evaluations are conducted of the placement of graduates of vocational education programs. However, for benefit/cost analysis, all costs and benefits incurred during their instruction would have to be identified and analyzed to determine the return on the investment. In addition, a pilot study of individuals who did have vocational training but who entered the same occupations would have to be conducted to determine the net worth of the investment in vocational education. Serious data gaps at the present time preclude such analysis, and these gaps should be remedied.

There is a belief that vocational education has a higher retention rate of potential dropouts than does academic or general secondary training; however, no valid studies to demonstrate this could be found. Some of the evaluation studies in communities indicated that individuals with superior abilities, as measured by intelligence tests, were being recruited into secondary vocational schools. One school system indicated a goal of increasing the number of high school students who would undertake education in a separate vocational school in the 9th grade. If one goal of education were to have as many students graduate from high school without commitment to specific occupational training, the efforts to recruit additional students to undertake vocational education in a separate school beginning at the 9th grade would conflict with that goal. No studies were being conducted in this area, and insufficient information prohibits appropriate analysis and display with which

The current high level of aggregation of data required by and submitted to the USOE does not permit evaluation of how these programs are being designed in relation to the reported job demand in a particular labor market area. Also, it does not permit comparing one school system or school with another in terms of effectiveness or economic efficiency criteria. The level of aggregation of many data now collected nationally is of little value. Disaggregation down to the community level of data collection will be necessary for effective evaluation of many programs and down to the school level for evaluation of others.

Garth Mangum, in Chapter 5, points out that the reporting system from which national data accumulate was designed for accountability and to provide estimates of state support necessary for the states to qualify for federal matching funds. The data reporting system must be refashioned so that it focuses on the final goals and outputs of the occupational education process and so that we may know what kinds of programs should be offered, in what types of institutions they should be given and what their relationships with other forms of education and training should be, who should take the programs, and whether they should be taken in secondary or postsecondary time frames.

Evaluation efforts at the state and local levels are not directed at determining why so little progress appears to have been made in implementing the mandate contained in the 1963 Act for cooperative relationships between the Employment Services and the departments of education to improve and make available information on current and prospective skill requirements. In the absence of provision of adequate data by the Employment Services, many jurisdictions depend on advisory committees to provide them with these types of data. It would appear appropriate for continuous evaluations to be made of progress in implementing the mandate of the Act by evaluation groups at federal, state, and local levels.

None of the jurisdictions surveyed had a formal plan or program for the systematic evaluation of the economic worth of vocational education programs. However, several governmental units, such as New York City, and Pennsylvania and New Jersey, had programs under way to establish integrated PPB systems with analytical staffs. Some states have formalized their approach to the traditional evaluation of vocational education; however, in terms of the overall decision-making process, very few evaluations were being conducted to help decision-makers identify deficiencies in overall objectives and goals or in programs or performance to attain them.

Completed research on occupational education is disseminated through the ERIC system to educational institutions and personnel throughout the country. However, this alone is not sufficient to achieve rapid transfer of new technology or implementation of sound conclusions and recommendations where appropriate. Such research has been undertaken at substantial cost. More positive leadership by the USOE is required to ensure the

and recommendations that could be useful at the state and local level.

Organization for Planning

The managers of education at all levels require planning staffs with the capacity to use the best modern planning and decision-making tools to help them accomplish their objectives. There are many significant impacts on education that underscore the need for full-time planning staffs to assist management of educational institutions in performing its work. Education must compete for resources with other demanding and high priority claims made on public funds. The environment in which educators must carry out their functions becomes ever more complex, with mounting sociopolitical pressures to allocate increased resources to disadvantaged persons, while changes in technology and shifts in the distribution of workers from one category to another make it increasingly difficult to forecast the job demands of the future. The alternative courses of action available to achieve the objectives and goals of occupational education requires an analytical capability to analyze their comparative benefits and costs and display them in a meaningful fashion for decision-making.

The reconnaissance surveys in the states and communities found that planning was performed on an ad hoc basis by provisionally organized committees. The director of vocational education and his deputy would frequently take time away from other pressing and demanding tasks to form a planning committee with a few other selected officials such as division heads. The director and deputy director have broad responsibilities for all aspects of the program, including liaison with other state agencies such as the board of education, the department of labor, the budget office, the legislature, and representatives of regions and townships. They obviously cannot give full time to planning. The division heads also have pressing operating responsibilities.

Planning and programming takes place on the basis of the experience of prior years, with changes from the base receiving the attention of the planning committee. Such changes would include the introduction of new types of program offerings, the need for new facilities, or the need for added teachers.

In the larger states, assignments are made within each major division to individuals in the area of curriculum planning. There will also be two or three persons assigned on a full-time basis to plan for new facility construction or improvement of existing facilities. The curriculum development planning, although important, is not a concern of this research effort. Facilities planning should be integrated with the overall planning system.

Many of the national, state, and local leaders of vocational education have been concentrating their efforts on refashioning vocational education to meet the changing needs of the world of work. However, they do not have the long range planning staffs with the analytical capabilities that would help them make vocational education fully responsive to current

that contribute to inertia and resistance to change. For one thing, facilities and equipment have been put in place at some expense, and there is hesitancy to abandon them. Even if the will is there, difficult battles may have to be fought with a reluctant legislature. In addition, the faculties of vocational education establishments consist of individuals trained to be home economics teachers, teachers of office occupations, teachers of technical training, and the like, sometimes with skills limited to only a few job courses within their occupational specialty. A decision to decrease home economics training and increase technical training immediately runs into the rigidities imposed by the distribution of skills and capabilities of the teaching staff. Further rigidities may be introduced by parental and student attitudes and interests reflecting continued support of past program offerings. Additional constraints are imposed by legislative enactments, administrative decisions, rules, regulations, policy guidelines, and operating procedures. Such requirements, for example, may insist that faculty members have teaching certificates. There may not be a sufficient number of teachers to accommodate training in a rapidly expanding area of increased job demands, such as technical training. The system may be unresponsive to the need, unless some manner of easing requirements for the recruitment of faculty is found.

The boards of vocational education at the state level and similar organizations in the communities surveyed do not currently have on their staffs economists, operations research analysts, or systems analysts. They do not have formally constituted planning organizations. The superintendents of public education and of vocational education require planning staffs with analytical capabilities to collect and display the information that they need to make decisions that will help make the educational system more responsive to the current and prospective needs of both the world of work and the students who must take their place in it. Recognition of the need already has led to action by at least two states and two communities to establish long range planning capability, and other jurisdictions are interested. Portions of this report suggest some major issues in occupational education that merit high priority attention from such planning staffs.

The basic concepts and new approaches recommended in this report will require that substantial changes be made in the manner in which occupational PPB has been performed at all governmental levels. Qualified professionals with requisite skills to staff the new planning organization are in very short supply. Such personnel are required at all governmental levels for a large variety of program areas. Persons may be brought rapidly to an improved degree of capability in these areas if they have qualifications and experience to permit obtaining substantial benefits from a course in educational planning and programming. Such a training program should be designed to accommodate the needs of the educational sector.

Many new decision-making tools and techniques and technological improvements in reporting systems are now available for application to the

approach is not easy to carry out. However, it promises rich yields to the educational manager who employs the systems approach to challenge past assumptions and practices of decision-making and to evaluate alternative courses of actions from the benefit/cost perspective by teams of interdisciplinary specialists and who utilizes the best of current and emerging tools of decision theory to help perform the vitally important function of preparing people for the world of work.

Many interdependencies exist between occupational education and secondary education designed for college preparation through the academic track and for general adjustment to life through the general track. The appropriate balance in terms of student enrollment for pathways through secondary education has never been determined in an objective manner by any jurisdictional level. Yet, as indicated in the literature and in this research, there are many alternatives that are sometimes in conflict and require harmonization in terms of societal as well as individual needs. Research in this area should be given high priority attention.

Additional interdependencies exist between manpower education and training and vocational and technical education. Training accomplished through welfare auspices is also among the alternatives that require careful evaluation in terms of the advantages and disadvantages of alternative approaches.

Although not within the scope of this particular research project, such interdependencies suggest that planning systems and staffs should be established at the level of the superintendent of instruction at any major jurisdiction for secondary education, and that this planning effort should be carefully integrated with the establishment of PPBS systems for occupational education. Title V of the Elementary and Secondary Act, as amended, provides for strengthening state departments of education. This Title should be strengthened to make more funds available for establishing modern planning systems at both state and local levels. The current Act is limited only to the state level, while much of the decision-making for secondary education occurs at the local level. It would facilitate wiser use of the substantial resources for secondary education if Congress made funds available through Section 4(c) of the Vocational Act of 1963 for establishing and strengthening planning systems and staffs at both state and local levels.

PART II: OBJECTIVES AND GOALS

Chapter 3

INTRODUCTION

The 1958 Rockefeller report* set forth as an objective equal opportunity and the fuller use of underprivileged minorities. It stated, "Until the Negro has been offered equal opportunity with the non-Negro to develop and use his individual talents to the utmost, and until he can be encouraged to make the most of his opportunity, we shall have failed to achieve our moral goal."

Nine years later, can we characterize with any precision our progress toward attainment of this objective? The eruption of violence in many urban areas in the summer of 1967 suggests an adverse judgment on the adequacy of progress by at least some members of the Negro community. Did concentration on college-bound students, students with outstanding talents; the average, well motivated students; or emphasis on other objectives result in lesser priorities for programs attending to the needs of the disadvantaged? Could and should more have been done?

It is not intended to assert that the summer's riots were due to deficiencies in performance of educational programs, unemployment in the ghettos, or other specific factors. Obviously, all social ills cannot be laid at the door of education. But in the formation of educational objectives, it has been long recognized that the schools have important contributions to make to equality of opportunity and the equipment of all individuals with the competence essential for entry into the world of work.

This part of the SRI report is concerned with how objectives and goals are determined by the states and communities.* It is basic to a sound planning process that all energies of the enterprise should be geared to the attainment of the agreed on objectives and goals. The acceptance of sound purposes is pervasive throughout the organization. Once established, how co we identify and choose among alternative programs to achieve them? How do we obtain and allocate resources among competing programs after selection, and how do we measure progress toward their attainment?

Chapter 3 is concerned with current concepts and practices affecting the establishment of objectives and goals. There has been a great outpouring over the years of literature and statements on the manifold objectives of education. However, these have not been subjected to the vigorous discipline of the systems approach to planning. Their promulgation has not been accompanied or followed by the consideration of alternative programs to achieve them, the establishment of priorities among them, the setting of final output goals, or the measurement of progress toward the goals.

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* See Appendix B for an outline of state and local objectives and goals for vocational education.

Grant Venn points out in Chapter 4 that although valuable, the systems planning approaches should assist in better accomplishing the objectives, and not become "ends in themselves." He stresses that occupational education is necessary for everyone, and should be an integral part of every school program. He points out that the great diversity in approaches to vocational education among the 50 states and thousands of school districts further complicates the planning process. The development and conservation of our human resources is the broad long range objective of vocational education. Commissioner Venn sets forth some short, intermediate, and long range objectives for vocational education.

The papers by Garth Mangum and Charles Hitch are included in this part even though they focus on subject matter in addition to objectives and goals. Garth Mangum asserts that "it is less than clear what vocational education is, what its goals are" and that "there is no consensus on what vocational education's goals should be" or in what type institutions it should be given. He questions:

> Does the student do better in the long run who attends a vocational high school, receives vocational training in a comprehensive high school, pursues an academic course, or who . . . simply drops out without completion?

His provocative paper discusses competition of public school occupational education with other programs and identifies data gaps and deficiencies. Mangum is a member of the Vocational Education Advisory Council, which is charged with providing an evaluation required by the Vocational Education Act of 1963 to the Secretary of the Department of Health, Education, and Welfare and to the President and to the Congress in January 1968.

Charles Hitch points out in Chapter 6 that the PPB system has definite applicability to vocational-technical education. He states that its purpose is to make better, not easier, decisions. The PPB system and effectiveness/cost analysis "plays only a supporting role in optimizing decisions . . . . it assists the decision-maker by furnishing him relevant facts with which he can inform and sharpen his intuition and judgment; it does not itself make the decision in *any* area." He stresses that all large organizations, whether government, business, or educational, have many problems in common and draws on his extensive experience to suggest how PPB applications might be applied in other areas, such as education.

Current Concepts and Practices

Objectives

The educational institutions of the country are expected to contribute to the solution of many urgent problems affecting society. The President's Panel on "Education for a Changing World of Work" focused on the requirement for vocational education to relate its programs more responsively to the needs of an economy quickened by the accelerated pace of scientific and technological change.

The President's message of 1967 on "Education and Health in America" set forth objectives of training the disadvantaged, ending discrimination, reducing unemployment, and improving training for the world of work, among many other new federal programs. Much of the legislation, such as the Manpower Development and Training Act, Project Headstart, the Neighborhood Youth Centers, and portions of the Elementary and Secondary Education Act, is designed to provide education for disadvantaged children and adults to help them overcome the burdens of poverty and receive increased benefits from society. Additional programs have been assigned objectives to ameliorate the conditions of those in poverty through social legislation to correct inequities in housing, through placement of government orders in distressed areas, through concentrated employment programs to provide jobs in ghettos, through model cities programs, and the like. But the contribution of education to provide the individual with the resources to break the cycle of poverty and enter the mainstream of economic and social life is basic. Therefore, a major focus of recent legislation is on the education and training of the disadvantaged, the elimination of discrimination, and the provision of equal opportunities. The problems of minimal motivation of many in the poverty and minority groups, the obstacles to educational attainments raised by depressing family and neighborhood environments, and the differences in individual aptitudes all are referred to educational institutions for solution. The explosion of disadvantaged persons in many of the slums of our major cities serves to underline forcefully society's expectation that education and training will help to reduce social tension.

A note of urgency enters into the consideration of progress toward these objectives. Frustration with the recent Newark and Detroit riots led to a search for causes and an attribution of fault. The *New York Times* of July 24, 1967, reported that:

> Concerned over the rioting in a number of cities, members of a Senate subcommittee placed a share of the blame today on the "educational starvation" of the ghetto poor.
>
> Senator Robert Kennedy said: "From all I've seen, traveling around the country, the ghetto schools deserve a flunking grade. . . . We pass bills and appropriate money and assuage our consciences, and local school systems keep right on doing things the way they've done them for decades.

It should be pointed out that attributions of blame were also made to other institutions. Dr. Daniel P. Moynihan, in the same issue of the *Times*, stated that, "the violence was essentially caused by a large, desperately unhappy and disorganized lower-class community in American cities that happened to be prevalently nonwhite." His solution is for national action to help restructure Negro family life by a series of actions. Other attributions of blame were assigned to Communists, to official antipoverty workers, and to agitators organized nationally. Causal factors probably included all of these, plus many more of diverse nature. The only point in citing these attributions, including that of education, is to stress the high tensions and feeling of urgency on the attainment of the objectives through programs that are conducted in part by educational institutions. Many of these programs are additive to long-standing educational objectives of searching out the gifted and talented students, the good students, and the well-motivated students and helping them to develop their capabilities to the fullest in the pursuit of quality and excellence to serve both individual and societal high priority needs. An illustrative outline of the objectives of vocational education is given in Table II-1.

With such multiple purpose objectives all converging on education, how do educational managers decide among competing claimants how to allocate scarce resources? Particularly where objectives may conflict, how do they exercise choice or set priorities? How do they coordinate their programs with others sharing mutual objectives, such as manpower training, training within industry, and proprietary schools? How do they measure progress toward attainment of the objectives?

The Need for a Systematic Statement of Objectives. The states have not formally identified their objectives in a systematic and meaningful manner that could guide logical planning activity. Their statements of objectives are thoroughly mixed with planning premises, exhortations, policy and administrative guidelines, funding prescriptions and constraints, and procedural guidelines. The objectives in each state are scattered among numerous documents including the state plans, the Projected Activities Reports, individual occupational syllabi for office occupations, distributive education, trade and industry education, home economics, and the like. In short, there is a lack of systematic approach to the establishment and identification of objectives.

It is the purpose of education, including vocational and technical education, to accomplish certain specified objectives. Clear, systematic formation of these objectives is essential to focus resources and energies directly on achieving defined purposes. The search for alternative programs or courses of action to achieve the objectives, the choice of the optimum or preferred programs based on display of data presenting the benefits and costs of alternatives, the ranking of priorities among them,and the measurement of progress all should proceed in logical, systematic sequence.

This criticism should be viewed in light of the fact that each state is required to submit a plan for vocational education in compliance with federal requirements set forth by the USOE to gain eligibility under the Vocational Education Act of 1963. The USOE regulations are applicable to programs of vocational education administered by State Boards of Vocational Education under the Vocational Education Act of 1963, the Smith-Hughes Act, the George-Barden Act, and supplementary amendments of these acts. The state plan is a written description of the state's vocational education programs and must be submitted and approved by the Commissioner as a condition for the allotment of federal funds. It sets forth the state's authority under state law for its administration of such programs and includes the policies to be followed by the state in maintaining, extending, and improving existing vocational education programs and in developing new programs to the end that persons of all ages in all communities of the state will have ready access to vocational training. The state plans state that the training, or retraining, will be of high quality, with offerings that have been developed in the light of actual or anticipated opportunities for employment and that are suited to the needs, interests, and ability of persons to benefit from such training.

Except for facilities planning, which will be discussed separately, planning documents fall far short of adequately and systematically relating existing programs to objectives and goals. Nor do the state planning processes facilitate, require, or, as now practiced, result in the establishment of priorities among programs in relation to need or in an examination of alternative courses of action to achieve the objectives or facilitate the planning process, the state plan is not, nor does it purport to be, an annual plan of action or an intermediate or a long-range plan. A state plan is merely an agreement by the state to meet conditions stipulated by the federal government so as to become eligible for federal grants. It contains objectives, policy, and administrative guidelines and fiscal and other constraints. Its designation as a state plan may have led some to mistake form for substance and to conclude that satisfaction of these minimal legal requirements will substantially cover the planning that is necessary. The state's projected activities report is also required by USOE and is stated by the latter to be the "annual program plan" related to the state plan. This serves to concentrate planning and programming on resource inputs such as facilities and teachers added which at best could be designated intermediate rather than final goals. More creative leadership in planning and programming is required.

Basic steps must be followed in any sound, logical planning, whether that of a business company, a public agency, or an educational organization. As pointed out in Koontz and O'Donnell:[6]

> The first step in the planning process is the establishment of planning objectives. This must be first at the level of

> the entire enterprise, but the necessity for having an objective or objectives for each derivative or subordinate plan likewise becomes evident. Planning must be for or toward some goal to be meaningful, because the objective gives the key as to what basically to do, where to place the primary emphasis, and what to accomplish by the network of policies, procedures, budgets and programs . . . the objective of the entire enterprise should control the direction of major plans affecting the enterprise as a whole. . . . Major departments objectives and plans give a key to the objectives of the derivative departments, and so down the line through the organization structure.

Educational personnel have always given much attention to the establishment of general objectives and goals and to desired behavioral outcomes at the specific course level, or those concerned with recall or recognition of knowledge, and the general development of intellectual abilities or skills. The sheer volume of published material is impressive.[6-22] Equally impressive is the absence of theory or practice to ensure that the state objectives are realistic and that they are operational. Clear formation of overall objectives and goals for decision-making at the broadest level of the educational enterprise at the state or local jurisdiction, the consideration of alternative programs for their attainment, the choice and the relationship of specific programs and resources to objectives and goals, the establishment of priorities among them, and evaluation to measure progress toward their achievement have been given inadequate attention. The determination of the desired behavioral outcomes of a specific course is important. But how is the decision made in the first place to give one course X or a number of courses X and not give course Y at all? How do such derivative decisions, which affect resource allocations, programs, and clients, relate to overall objectives and goals?

Illustrative Structure of Objectives. The surveys of the states clearly indicate that such formal structuring of objectives as part of the planning process does not now exist. A more logical statement of the objectives of education might look like the outline for vocational and technical education that appears in Table II-1. These objectives are derived from state plans, interviews, and documents. Such a display suggests that there may be conflicts among the objectives. Specific courses of action taken to pursue one objective may inhibit another. By compromise and adjustment, a deliberate attempt may be made to obtain some optimum end result representing partial harmonization of several objectives.

Objectives are classified in six major categories. Some objectives may fit two or more of the listed categories and are then listed as "general" in nature. One such is: Provide access to high quality vocational education for all persons in the state. Programs constructed to satisfy this objective conceivably could contribute to economic efficiency, equity, and socialization objectives. A program can also be structured more narrowly, so that it would contribute to only one of the other categories described below.

Table II-1

ILLUSTRATIVE OUTLINE OF THE OBJECTIVES OF OCCUPATIONAL EDUCATION

General

Objectives that fit several categories--such as provision of vocational education of high quality within easy access to all persons in the state.

Economic Efficiency -- Individual and Societal

1. Fit students with the skills, competencies, knowledge, and attitudes necessary for placement in gainful employment.
2. Train and place students in specified jobs or job families.
3. Train students to obtain optimum use of limited resources in the satisfaction of consumer wants.
4. Meet national, state, or local business, industrial, governmental, and other needs for trained personnel.
5. Ensure optimum return from the use of resources allocated to vocational-technical education.
6. Develop a trained work force that contributes to the economic growth and development of the nation, state, and locality.
7. Contribute to the reduction of unemployment.
8. Ensure that the individual will be trained in occupational skills that will field the highest economic return for the individual and society, consistent with noneconomic goals.

Equity

1. Income Redistribution

    a. Correct educational deficiencies or handicaps that prevent persons, groups, or regions from participating fully in the economic life of the community.

b. Provide training to those with special needs, such as the economically handicapped, illiterates, physically and mentally handicapped, the migrant workers, and the culturally deprived.

2. Noneconomic Welfare

   a. Provide equality of opportunity for individual fulfillment.

   b. Eliminate discrimination due to race, sex, age, and creed.

Socialization

1. Provide for continuity of our cultural heritage.

2. Provide for fuller participation in citizenship.

3. Reduce social tensions.

Other Noneconomic Behavioral Outcomes

1. Provide quality and comprehensiveness in the learning process.

2. Develop individual capabilities and personalities to the fullest.

   a. Intellectual development (developing interest in asking "why" questions and skill in answering them)

   b. Problem-solving competence

   c. Acquiring cultivated enjoyment

   d. Developing skills in the mechanics of communication and computation (reading, writing, spelling, speaking, mathematics, logic, foreign language)

   e. Acquiring a command of organized disciplines (history, biology, physics, chemistry, etc.)

   f. Providing for training or education for personal satisfaction (nonincome producing).

National Security

Meet national security objectives for trained and educated manpower.

The second category is economic efficiency. By economic efficiency is meant the achievement of the highest possible output for a given cost or the lowest possible cost for a given output consistent with consumer wishes. With respect to vocational education and investment in human beings, this implies that educational dollars should be invested in those skill areas that yield the highest marginal or extra return per extra dollar invested. The degree of attainment is measured by placements, earnings, efficiency in matching skills, and abilities with occupational opportunities or other indices.

The objective of ensuring optimum use of the resources allocated to occupational education would also be concerned with the interaction among the pupil, his teacher, the equipment he uses in the learning process, and the rapidity and effectiveness with which knowledge is imparted, acquired, and retained.

Most of the states emphasize the economic efficiency objective as being primary. For example, the Director of Vocational Education in one state said: "Vocational education has as its controlling purpose the preparation of persons for useful employment." He also asserted that as a descriptive term, "vocational education" applies solely to the preparation for occupations that can be achieved through the high schools, the junior colleges, and the adult classes that are a part of the public school system. Such a description immediately narrows options for the consideration of alternative ways to achieve the objectives. It excludes from consideration Department of Defense programs of instruction, on-the-job training, proprietary schools, and many possibilities of innovative new approaches that could be applied outside the public school system.

The third category is equity. Equity objectives are designed to provide increased opportunities and benefits for less advantaged members of society. Such objectives are designed to partially compensate for inequities. An income redistribution objective of one state is as follows:

> Training for the disadvantaged . . . is not limited to the acquisition of an occupational skill. Prevocational training and numerous special services, such as diagnostic counseling in depth, social and medical supportive aid, outreach, job development, placement and follow-up on an individual basis are provided along with preparation for skilled occupations . . . counseling will be continuous, accomplanying the individual from the time he enters the training situation to the time he is successfully employed.

The goal of income redistribution may conflict in economic terms with that of economic efficiency. Training of the economically, educationally, or psychologically handicapped, especially when there may exist a large number of persons available for training who are not so handicapped, will almost invariably result in a relatively lower marginal return per investment dollar for society. The training of those who are transient or "hard core" members of the poverty subculture may require a higher teacher-pupil ratio than the norm, more counseling, more equipment, and more preparatory work with resultant higher costs.

Society is committed to such humanitarian goals and has decided to assist such handicapped persons to become relatively more self-supporting and thus reduce the burden of direct transfer payments. In terms of the economic maintenance of the individual, fewer resources relative to the benefits received might have been used had society simply stuck to the policy of direct transfer payments. Efforts must be made to introduce into benefit/cost analyses the per capita benefit of saving a child or student from relief and welfare rolls, from juvenile delinquency, and from other costly antisocial behavior.

The nondiscrimination objective may also conflict with economic efficiency. Women's participation in the labor force is on the average much lower than men's since it is interrupted by domestic and other nonmarket production. The economic market returns of investment in training women compared with investment in training men are much less. Yet, society chooses to make occupational training equally available to all.

The fourth category represents socialization objectives. Socialization objectives require substantial resource inputs that could conflict with the economic efficiency consideration. Objectives here could include the following: acquire attitudes and skills that help to establish values that strengthen home and family life, provide for continuity of our cultural heritage, assume responsibility for participation in citizenship, enrich personal and family life through the arts and humanities, and, through refreshing use of leisure, reduce social tensions.

The fifth category represents other noneconomic behavioral outcomes. the objectives here would include the consumption of education for its own sake and the provision of quality and comprehensiveness in the learning process. The latter would be concerned with motivation, behavior in the learning situation, developing capacities and personalities to the fullest, and the performance of the educational establishment rated against established norms.

The sixth category, the national security objective, is very significant to education. The states frequently cite it as one of the objectives for technical training. The inclusion of national security is a legitimate objective of occupational education at the state and local levels, even though conducted to meet national needs and decisions. Considerations of trade-offs between conducting certain kinds of training in the Armed Services and conducting them in the public institutions are appropriate issues for research, information display, and social policy.

The objectives under each of the categories were synthesized mainly from the state plans, from the interviews, and from many other documents collected during the research project. They were paraphrased in some instances and placed into the structure as displayed. The category structure is offered tentatively and illustratively to point the way for further research as part of a systematic approach to planning. The list is not exhaustive, and it is clear that these objectives have a tendency to overlap.

The structuring of objectives in this matter suggests the possibility of conflict among them and the need for establishing priorities among programs to achieve the several objectives. The objectives naturally should facilitate the search for and creative development of alternative strategies or programs to achieve them. The alternatives should be subjected to analytical techniques, both qualitative and quantitative, to help decision-makers choose the preferred program or programs.

State Level Objectives. Pages 185 through 192 of Appendix B reflect the intermingling of objectives with exhortation, policy, and administrative guidelines, intentions, and financial constraints. They represent only a partial display of findings of the research. Items 6 and 7 on page 185 of the Appendix are concerned with fiscal constraints. Items 1, 2, 3, 8, and 9 on page 185 are concerned with administrative prescriptions and intentions. Item 4 is concerned with the provision of high quality vocational education and could meet all of the objectives listed in the illustrative outline in Table II-1. Most of the states included the objective, "to construct facilities" as reflected on page 188, item 7 for State E. Perusal of these objectives reflects a certain amount of redundancy in that economic efficiency objectives repetitively appear, stated in different forms, of preparing individuals for jobs. The equity objective also appears in all states, as reflected in item 13 on page 185. The socialization objective appears in one form or another in most state lists. The relationship between derivative objectives and the overall objectives for decision-makers is illustrated by the list of behavioral outcomes desired for specific courses on pages 187-189. Items 9 through 13 on pages 187-188 include the derivative behavioral outcomes desired for home economics courses in one state. These behavioral outcomes do not appear to be directly relevant to placement in employment outside the home.

Some states set forth their objectives and goals in a unified statement. The statements of objectives and goals for three states appear on pages 190 through 192. The same mixtures as found in the state plans are reflected in these statements. Item 1 on page 190 reflects the economic efficiency objective. Items 11 and 12 are illustrative of administrative guidance and exhortation. The objectives on page 193 represent objectives recommended by panelists in a symposium in one state. There seems to be an inordinate occupation with resources rather than with final outcomes in this list, such as "to use school facilities more effectively, to develop new school facilities," and "to improve collection and utilization of data on unemployment and job openings." "To accomplish coordination of training programs between public and private agencies" is concerned with utilization of administrative techniques. "To improve the image of occupational education" could be important in creating a climate to obtain funds and clients, but certainly does not seem appropriate for a statement of overall objectives, concentrating on the final objectives of education.

As an interesting departure, a Michigan survey group with broad representation describes vocational education in reference to the total objectives of public education, "The Objectives for Public Education in Michigan," which appears on page 190 of the Appendix. The report[20] states:

> Programs in vocational education contribute to the twelve objectives listed therein, but the objective to which they should make the largest or most direct contribution is number four: To develop abilities, attitudes, skills and understandings that make a person an intelligent, occupationally competent participant in the changing economic life. The goal of programs of vocational education should be to contribute in a unique and specific manner to the development of individuals who will possess necessary competencies for chosen occupations. A concomitant goal should be the economic improvement of society.

If resources were available so that all of the objectives described above could be satisfied, there would be no need to establish a planning process or to make choices among alternative strategies to achieve the objectives. But in the real world, resources are limited and there is always the need to decide which objective to pursue. The more complex the environment, the greater the amount of resources made available, and the greater the number of variables to consider, the more urgent is the necessity to establish systematic planning processes. The directors of vocational education institutions at the federal, state, and local levels require information displayed before them in a meaningful manner to facilitate decisions with respect to the resources to be allocated to competing programs.

Community Level Objectives. Objectives within and among the 11 cities will be discussed with respect to their: (1) completeness, (2) degree of specificity, (3) orientation and emphasis with respect to priorities, and (4) time dimension.

Completeness. The cities vary in the completeness with which they list the basic objectives of (1) "general institutional orientation," (2) efficiency, (3) equity, (4) socialization, (5) education, and (6) national defense.

A search of the reports and documents on each city reveal that the first five objectives (1) - (5), are stated or implied in some fashion. The national defense objective, however, does not get stated either explicitly or implicitly. However, if the localities were reminded of this particular objective, they would undoubtedly affirm it.

Specificity. The degree of specificity varies greatly. Some cities have "no formal statement of objectives or goals for the vocational programs of the . . . Public Schools." The officials here simply express matters in terms of having a "strong program." Other cities specify objectives in great detail. In doing so, however, they invariably mix in combinations of final and intermediate goals, administrative prescriptions, and the like. Some cities recognize the interactions and interdependency among objectives.

Priorities. Relative emphasis and priorities vary greatly. In general, ordinal ranking does not occur. However, one city aggressively states firm priorities. The best examples of this relate to the efficiency objective; e.g., one city asserts that "Although goals (objectives and goals) may be instigated relative to improving the student services and similar aspects of the school, in all cases employment needs for the area are met first." Or, for instance, a brochure for one school proclaims: "The basic correlates of all objectives and goals of the institute are those of the business and industrial needs of the area." This school advertises its offerings on television. Contrast this with the "softer" line taken in another city: "Priorities in establishing goals . . . is given to training for employment. All programs, however, must set up objectives in providing for useful citizenship and training in the arts (personality development)."

Another city says simply that "the objective is to educate kids so they can be employed." They have no published document on objectives as such.

Finally, it is usually the case that the efficiency objective is listed or stated first in any list of objectives (although one city lists "a general education for all students" first) and the other objectives are simply presented in no particular order.

Time Dimension. Time dimensions exist more for goals than they do for objectives. When the interviewees begin talking about time dimensions, it often becomes clear that they are thinking in terms of their capital expansion program. For instance, one city plans its objectives (goals) "five or ten years in advance." But this is clearly with reference to facilities. Another has a mixture of goals, objectives, policy directives, etc., that are laid out on a quarterly basis for immediate action.

As a general rule, objectives are ongoing and do not have a specific time dimension.

Goals

A distinction between objectives and goals has been introduced into the literature on long range planning. Objectives are those general purposes pursued over time and are generally not quantified. Goals are set for specific periods of time and are usually quantified. Examples of general objectives of vocational and technical education would be to produce a labor force with the skills and competencies necessary to contribute to economic growth, to reduce unemployment, to educate the disadvantaged, and to provide equality of opportunity Others have been set forth in Table II-1. Objectives remain relatively permanent and are pursued indefinitely over time.

Action to achieve objectives requires the establishment of programs with specific, quantifiable goals. These are shorter range in nature and can be modified as necessary. Goals for education can be stated in terms of the number of students who should complete secondary school, the number of graduates who will be college-bound, the number who will graduate from general track, or the number who will graduate with skills fitting them for employment in specified occupations. Alternative programs can then be structured to achieve the goals. Given the goals, benefit/cost or effectiveness/cost analysis can then be used with other tools to determine the best manner of achieving the desired goals.

State Level Goals. The states do not now make such distinctions between general objectives and goals. The absence of such a distinction results in the setting forth of numerous programs that are not directly related to specified objectives. In many instances, these programs do not have final goals specified for them.

Goals have been quantified, but these may be found only after careful search through many documents. However, even where goals have been set, they are resource-oriented rather than directed toward final outputs. For instance, the goals set forth the number of facilities to be built or the dollar cost for the square footage of such facilities. Or they indicate the ratio of faculty to students or the number of teachers to be trained or added to the staff. They state the anticipated number of enrollees to be trained or the percentage of total enrollees in secondary schools who should enroll in vocational courses.

These are resource inputs or intermediate goals, not final goals. They may be useful in getting resources into place, but the absence of goals reflecting final outputs of the educational process represents a major gap in the planning process. Such intermediate goals may have been useful for the first two or three years after passage of the Vocational Education Act of 1963 for the purpose of getting resources into place rapidly--bringing in more teachers and facilities and getting more research and other personnel focusing on problems of vocational education. Now it is timely to direct the planning process toward the achievement of the final outputs desired of the educational system. Output-oriented goals should be identified not only for the economic efficiency and equity objectives but also for socialization, educational, and other objectives.

Community Level Goals. Goals will be discussed on the basis of their completeness of statement, specificity, relative priorities, time dimensions, and quantifiable nature. Less can be said in general about goals at the city level since there is less source material in this area.

Completeness. Again, the detail given on goals as well as the range of goals varies among the cities. One city has a clearcut set of goals built into its 1966 proposed budget. Another lays out its goals in terms of the strategy to be used to achieve them. The goals are established for resource inputs and at best are intermediate in nature.

Specificity. While the goals so stated are mainly input goals, they vary in degree as to their specificity even within the same organization. Thus, for one city, at one level, they state as a goal "to plan and prepare for a move into a new facility"--a very specific goal. But in contrast they also have goals such as "continue to provide the students and businesses with part-time placements."

Priorities. It is almost as difficult to assess relative priorities among goals as it is to assess them among objectives. For the former, however, the presence of activity toward achieving some goal automatically ranks that goal above those that remain nonoperational. For instance, one city has made the decision to push its OVT (Occupational-Vocational Training) program and is intent on converting the school system over to a comprehensive high school basis. Another city is intent on instituting a PPB (programming, planning, and budgeting) system. These input goals, at least, can be assumed to have high priority.

Also lacking is a careful structuring of the subsets of goals and goal priorities to achieve a higher goal. For instance, given that a city is committed to an OVT program, it simply lists a group of goals, some of which are subgoals, and it does not indicate any strategies or priorities to attain the goals. Presumably, all these are pursued simultaneously with an equal intensity of effort; however, this is not the case.

Time Dimension. Time dimensions are generally stated with respect to input goals, e.g., the planning of the capital budget for six- or ten-year periods. Operating goals are usually quantified on an annual basis or for a two-year period.

Quantifiability. There is resistance to the notion of quantifying goals. One city argues that ". . . goals are not quantified and as a matter of fact the question was raised as to how one could possibly quantify goals in this field." However, another city is aggressively pursuing an education policy that is oriented toward the economic efficiency objective so that the implication in favor of quantifying goals here is apparent.

Chapter 4

OBJECTIVES AND GOALS OF OCCUPATIONAL EDUCATION

By

Grant Venn

Sound evaluation and planning are means but not ends. Evaluation and planning are valuable tools to accomplish objectives and we need more planning and evaluation of the objectives of vocational education; however, it often appears that in the process of planning and budgeting programs, we sometimes forget that program planning and budgeting are not ends in themselves but rather means of accomplishing objectives or goals. There are times when it appears from an operational standpoint that the systems planning approach at the local or federal level almost demands the establishment of an organization that will serve the system rather than the purpose of the organization. This mix-up of goals continues to hamper our progress in vocational education. How to determine the proper goal requires planning and evaluation not only by professional planners and evaluators but also by administrators and teachers. In doing such planning and evaluating, we should not be diverted from new approaches by past experience and success that might tend to confine us in old ruts. We are rather confused at present about the goal that we should follow.

It was the policy of the federal administration only ten years ago to end the provision of federal funds for vocational education and manpower training because they were not needed. Because the government took such a position only a short time ago, it is not too difficult to understand why the increased input today--roughly $2 billion from all federal agencies--is not so easily accepted at the local level.

There are some basic premises that will have to be considered in arriving at the goal of optimum vocational education. Incidentally, all these premises are open to challenge.

First, occupational education is as important today for everyone as learning the three Rs was in the past. Even two decades ago, there were many people who did not really need an education to become part of our labor force, because muscle power still had salability then. But today our economic structure has reached the point where occupational preparation is necessary for everyone.

Second, in the last few decades, a work-learning system that we used quite effectively in this country and that is still being used in most countries of the world is no longer viable. A large number of young people in the United States could enter active employment by having the simple admission requirements of good health and a strong body. They learned the work by the pick-up method. For all practical purposes and certainly for purposes of planning, this method is no longer workable.

Third, occupational education must be an integral part of every school program--whether elementary, high school, post secondary, college, or university. At what level the occupational preparation of any particular individual is carried out depends perhaps more on the individual than on the system, but it is clear that occupational education must be integrated into our educational system.

Fourth, there is still the problem of trying to define each institution's jurisdiction; where does it start, where does it stop? It is believed that the future concept will be that no single unit in our educational system or outside the system is going to be able to meet its objectives alone.

Fifth, the transition from adolescence to adulthood in this country is one of our greatest problems. On both ends of the economic spectrum, young people are trying to find the pathways, the patterns, or the procedures by which to move from adolescence to adulthood. This problem seems to be a result of the changes in our labor force and in our economic system. The fact that the adolescent no longer has a clearly defined role ties in with the concept of occupational preparation. At the root is a problem that is more basic: the individual's need to be a contributor to society, regardless of his family origin or economic background. There is a tremendous need for each of us to contribute to society and to have some work that gives dignity; this need is tied in with the transition from adolescence to adulthood.

Finally, in the modern growth economy with its rapid rate of technological change, there is no such thing as terminal education. Graduation as an educational term is one of our biggest problems because it implies that the graduate, regardless of what level of schooling, is prepared for a continuing role in society. Many people still tend, if not to believe this, at least to act as if they did.

There are definitely some so-called conflicts and cautions to be considered. First, caution needs to be exercised in searching for "the answer." If we just had a good management reporting system, if we just had a good evaluation system, if we just had a good planning system, we would be all set. Well, the truth is that we would not be all set. In the development of planning and evaluation, people are looking for the answer as if they could always find the system that would work best if only they searched hard and long enough. The assumption is also that this system would operate perfectly not only now but also in the future. There is real danger in this assumption.

Another area of conflict might be called "programs and people." The planning and budgeting systems must consider the wide variety of human beings. This human spectrum ranges from those with small skills and low aspirations to those with great abilities and high aspirations. Any single approach is likely to flounder on account of the variety of human beings. The alternative is a variety of approaches. Perhaps a poor system that people are willing to use will serve better than a good system in which people do not have much faith. The whole area of programs and people, the options of time and organization, raises the question of whether there could be any one system that would work best. Any system must take into account the various needs of our economy and society and the various occupations and professions, each of which requires its own approach to planning. What would be a good planning system for IBM might not be a very good system for Grantsville, West Virginia, which has 67 percent of its labor force in that particular area working for the schools or the county and state highway system, and the balance on relief. What would be a good system for New York City probably would not be a good system for Helena, Montana. The varieties of needs and conditions in our total structure must be considered in planning.

The next area of concern is the variety of social and political structures in our system that must be taken into consideration when making plans. Ideally, a PPB system implies that there is an organization that has certain objectives, operational functions, and a definite responsibility as well as the resources to achieve the objectives. The environment in which education operates includes the federal government with its departments, offices, bureaus, divisions, and branches, all of which share responsibility and contribute to the input. We also have the 50 states with 50 different political and economic situations and about 25,000 school districts concerned with vocational-technical education. We approach the problem of vocational education from the national level with a variety of concepts and methods and perspectives; the approaches from the state, local, and individual levels are no less diverse.

The application of a good educational system to a wide variety of situations is a key problem on which we need to spend more time. We have not as yet discussed where such a system should be applied, how it should be applied, and at what rate of speed. In the Title III Program, (Elementary and Secondary Act) which supports innovative approaches in education, the applicant files with the U.S. Office of Education, and we fund the research if we think it is of high quality. However, this ignores the question of the nature of the area submitting proposals of low quality. We tend to fund those from communities that are further up the scale in terms of manpower, money, and know-how. There seems to be widening gap between what is happening in the least able communities in this country and in the more advanced ones. This makes the problem of credibility of PPB even more difficult.

There is another area of conflict and caution--the matter of institutional change versus new institutions. The U.S. Department of Health, Education, and Welfare; the Department of Labor; and several other federal agencies are involved in a debate on how to bring about change. One side says, "Fundamentally you are not going to change the schools, because they are too tradition-bound, too hard to change, or there are too many institutions, so we should apply our energy to developing new institutions."

This approach has brought about the OEO, the MDTA, and certain other programs. Should we now establish new institutions or should we focus on affecting changes within institutions? If we opt for new institutions, we will not solve the problem completely because the new institutions will also eventually suffer institutionalization. What is the role of the school in a technological society compared with the role of the school a few decades ago?

The most valuable resource we have in this nation is people. In PPB we have to define objectives in terms of people and to work from this base rather than concern ourselves with the traditional manpower needs or labor market analysis. Regardless of what we find in the labor market in the way of manpower needs, we have only one source from which these needs can be met, and that is our human resource. The development and conservation of our human resources for occupational purposes below the baccalaureate level is the broad, long range objective of vocational education.

There are a number of specific long range goals for vocational education. First, every individual, whether he is a sophomore high school dropout or a Ph.D. in atomic physics, should have occupational competence. Second, individuals should be provided with opportunities to relearn so that they can continue to contribute to the economy. Third, individuals should be given the opportunity to upgrade themselves in the labor force. The scarcity of such opportunity is probably one of our greatest problems. Fourth, we should help meet the manpower needs of the nation through vocational education. Finally, we need to develop greater flexibility in response to the changes in society and in the economy.

As for intermediate goals, the first one might be to establish new relationships between public vocational educators and vocational trainers outside the public school system, so that maximum occupational skills can be learned at minimum cost. The second intermediate goal is to expand and redirect school and college programs to meet the needs of those who are not being served at present. Third is the development of better data collection, evaluation, and planning systems.

Immediate goals for vocational education might include provision of occupational information and guidance for all youths early enough to help them make future choices. This does not mean that they should be given information and guidance that will help them decide today what they are going to do the rest of their lives, but rather to help them build a premise from which they can make future choices.

Second, we should provide work experience to those who need it to develop employable skills. These are not the skills to operate a machine or do a specific job; they are "employability skills" that are necessary to handle any kind of job. These skills include the ability to be on time, the cultivation of the right attitudes, and the ability to take instructions. A person should have a chance to develop these skills in some kind of work experience--part-time, weekend, or whatever. Many young people today do not get this opportunity because of our changing economy.

One of our immediate goals should be to provide this work experience so that students who have gained specific occupational skills can be made employable.

Third, we must reduce youth unemployment through the expansion of vocational education and the development of new approaches and areas.

Fourth, we should provide transition from school to work. This help is needed mainly at the lower occupational levels, because once a person gets his M.A. or Ph.D., he has many people helping him find the kind of job that will match his skills. This help is necessary not just locally or nationwide but throughout the world. We have never really as a society accepted any responsibility for helping the individual make a transition from a low level education or skill development to a specific job. The schools have to get involved in this responsibility. We have a nationwide unemployment rate among adolescents of about 12 percent, and twice that for Negro youths. The unemployment rate for our general labor force is 3.9 percent.

Another important immediate goal of vocational education should be the expansion of training for skills that are in critically short supply.

One of the greatest problems in the administration of education is how to make the transition from program planning to operation. School administrators in certain parts of this country simply cannot use two or three kinds of research evidence without hurting the chances of a potential program. In certain parts of the country, one cannot mention the Ford Foundation; in other parts, one cannot mention research by Stanford, Harvard, MIT, or California. This situation is not good, but it is true. The question then is, how do we get certain kinds of research evidence and knowledge applied at the local level? In the West Virginia School System, expenditures were $289.00 per pupil in a system of about 25,000 students.

There is another problem of administration. I feel very threatened, frankly, in the Office of Education, about PPB systems. We have a tremendous staff working on this problem now; for the last two months we have had two professionals and a secretary. And I would guess that it would take all the staff we have in the Bureau to answer the requests that come from outside HEW about vocational education. We don't have the personnel. We do not have any more manpower in the Division of Vocational Education than in 1960, three years prior to the Act.

I have tried to share with you some of my reactions, ideas, conflicts, and cautions that I hope will be helpful to you as you discuss the more specific aspects of program planning and evaluation for vocational education.

Discussion

Mr. Kotz:

Thank you, Dr. Venn. During the early war years, I had the pleasure of working with the Lend-Lease Administration, and at that time the Roosevelt Administration had the problem of how to start the newly born foreign aid program. As you remember, the destroyer-for-bases deal started the lend-lease activities in late 1939 and in 1940, and the problen was, do we put forth this new approach, and the new programs in the Department of State, or do we establish a new agency? One of the problems that Grant Venn was addressing himself to a few minutes ago was, do you introduce change into old institutions or do you bring about new institutions so they can start from scratch?

As you know, the State Department has the reputation of sometimes being a little rigid and unresponsive to the changing needs of the world. It sounds like some of the same language they currently use in the educational area. At that time, it was decided to create an agency called first, Defense Aid Reports, which had a short life, and then the Lend-Lease Administration. They brought in Stettinius from U.S. Steel, quite a few university people from the great universities of the country, and industrialists, and Lend-Lease was set up. Some of the people there said, "We figure we'll introduce some new changes and be able to move faster and more promptly than some of the folks in the State Department, but after four or five years the State Department will absorb this new organization, and they will be better for some of the changes that have occurred." Others thought that the new agency would become larger than the State Department and have independent operating responsibilities of its own that would become permanent. Well, you know the history of that. The State Department later did absorb the new economic aid agencies that were an outgrowth of the early Lend-Lease days. The economic agencies did have an impact on the State Department; they did change some attitudes; but there was a merger of the new institution and the old. That was one response when some people in the position to make this decision felt they could not immediately change the old institutions.

One of the persons associated with the Lend-Lease Administration was Joseph Juran. He wrote a book about that period called, "Bureaucracy--A Challenge to Better Management." In it he pictures a society, which was then changing in terms of the structure of new government agencies of the war period, as being a new frontier, with people moving out to stake their claims for jurisdiction and higher rewards. That appears to be what is happening in the educational sphere today, with a lot of new responsibilities and appropriations and programs just legislated by Congress. Garth Mangum has published a small monograph in which he suggests, for more effective utilization of resources, bringing all of the functions of occupational education into the Labor Department. About the same time, an article appeared in Public Administration Review for March 1967 by Rufus Miles in which he recommends that we take manpower and training, some of the functions of U.S. Employment Security, some of the OEO functions, and the work experience training out of Welfare and HEW and put them all in a new Department of Education. I think that when you get a lot of new programs and resources, Joseph Juran's concept, that a lot of people stake out different claims and different new approaches on this kind of frontier, is as true of education as of foreign aid. It is very likely that not just one approach but a diversity will be used in the usual American tradition. Many of the institutions that are being challenged manage to survive, to absorb programs of some of the newer agencies, and to continue quite effectively. All of this is subject to the planning and programming process. What is the best combination of resources to use in reaching a particular goal? What alternatives should be considered? How do we reach decisions? These are some of the questions Grant Venn addressed today. Who will have the first question or comment for Dr. Venn?

Mr. Bushnell:

Let me pose a question. I was taken by your statement that the principal goal of vocational education is to develop and conserve human resources--that this orientation, as against supplying labor needs, or as against maximizing the match of trained personnel with open jobs, suggests to me, then, that we may, at some point in time, have to work against matching personnel with jobs--that we may become much more concerned with utilizing human resources that are there, even though there may not be jobs for them. Do you want to comment on the implications of that kind of goal?

Dr. Venn:

If you take a look at skilled manpower needs, you define a job, and from that you define the operations that are required, then you define the curriculum, and then selection. In the process of selection, you imply that some people are not eligible. Yet, we have to use whatever skills there are in the manpower pool, which is the total number of people in this country. The maximum productivity would depend on how well each of these individuals were developed. We have been matching people with jobs in a very hit-and-miss fashion, by chance almost.

We know that the average young person who now enters a low-skill job without specific training will change jobs four or five times the first year; he will just bounce around until he happens to find something he likes. In the long run, it seems that we should be more concerned in investing in the people we have, regardless of what competencies they may have, and develop these abilities. Then we will have to match these competencies against the skills we need. However, obviously we cannot just develop the human resource without some input from the other end. For example, you can develop a good system for ore reduction, but it depends on what percentage ore you have in your mined raw material. You might be able to get a good effectiveness/cost ratio out of 6 percent ore; you might have a quite different situation when you have to use 2 percent ore, and yet it may still be profitable to reduce lead even from 2 percent ore. It seems to me that we have got to take a look at the fact that we have all kinds of people who could be productive and who could contribute to our economy in some way. We must fit the standards to the people, instead of fitting people to the standards and rejecting those that do not fit.

Dr. Rosen:

There is a research project going on at Northeastern University in which the Department of Labor asked the researchers to take a group of people who are probably the most skilled in the country--the tool and diemakers--and ask the immediate supervisors whom they considered to be the best in their plants. Although the final returns are not yet in, the preliminary findings show that for the so-called best, there is no one single in which they learn their trade. Every variety, from the straight pick-up method to vocational education and apprenticeship, is used. Apparently there is no systematic way that dominates the training of the most skilled workers in our economy. If the final results bear this out, you get to an interesting question about systems. Now, there may be a question raised as to which is the most efficient way, the cheapest and fastest way. A person may go through the vocational education system and learn his trade faster and cheaper, or through the pick-up method, or the same may apply to the apprenticeship system. But when you raise the question about the fact that we have a haphazard system, let me discard the word "system"--we ought to do some thinking about the fact that this is going on. What kind of question does this raise about which way do you go in training?

Dr. Venn:

Maybe none of these approaches are the best way. We have had these approaches simply because there was no real necessity in the past to develop a systems approach. If we compare our approaches with those in the medical field, I am not so sure we should be willing to continue with these haphazard ways.

Dr. Arnold:

Howard, I wonder if I might respond for a moment. In this study, do you know whether Northeastern is looking at persons who are now working at tool and diemaking?

Dr. Rosen:

Yes.

Dr. Arnold:

Well, it is a pretty well-known fact in this country that many of the products of the apprentice program are no longer tool and diemakers. I am wondering if they are catching these people. You see, industry has learned a long time ago that a good apprentice out of a well-organized system becomes an excellent management man, a first-line level foreman, a middle management man. In fact, I just checked on a few students I had back in the 1930s who are chief design engineers now. They were all tool and diemakers and came through a vocational education system of three years, into apprenticeship, and then on to self-study, home study, and upgrading by the companies. I am wondering if we are going to get a good picture here by just talking with operating tool and diemakers now.

Dr. Rosen:

We have such a wide spread in ages here that they are going to pick people up who started 20 years ago, 30 years ago, and see where they are now. It is true that many of the Department of Labor studies show that people who take the apprenticeship program end up as supervisors and entrepreneurs. This would say that one particular system trains for both working staff as well as for foremen. It also means that when the supervisor says the 400 best men in and around the Boston area come in with this variety of skills, it raises all sorts of questions now.

Dr. Venn:

Essentially what we cannot do is develop a system that will work in all situations because we have several different levels of sophistications in the states. Perhaps we should concentrate on one state. Here we could move faster and further than if we attempted to go too far everywhere. Such an approach would show what could be done. This state might, at the same time, provide the field laboratory for development of manpower. Or we could concentrate on five or six demonstration areas in each state to perfect occupational guidance, work study, and entry job placement; this is basically the concept behind the new amendment to the Vocational Education Act. We think we might accomplish more overall change by first finding four or five school districts in each state that would commit themselves to these concepts than attempting to provide funds for everyone.

Obviously, we do not have funds enough in vocational education to take over all education except college preparatory work. However, the concept of training someone as a craftsman in a particular trade is not too viable any more. I am seeing vocational education more and more in much the same way as I see mathematics. It is becoming an integral part of the school system. I think we will have to redefine vocational education in much broader terms, because the environmental situation is becoming much more complicated. And we have to do something about occupational guidance and information, because our kids no longer have the opportunity to see at first hand the many kinds of jobs that are now available or the ways to learn how to achieve these skills.

To provide this occupational guidance will require a good deal more money. The 1963 Act has certainly broadened the concept of vocational education, but it still does not provide funds for certain programs at the lower level, and we cannot fund for certain youngsters unless they are in a specific vocational program. There may be a girl taking precollege courses, but in October of her senior year she decides she cannot afford to go to college. The only skill she has learned is typing because she would have needed that in college. It seems to me that we must come to the rescue of this youngster and provide some short, intensive, entry job skills that will make her employable in the labor market. This would not preclude the idea of letting some youngsters make choices earlier in high school and others at the postsecondary level.

A study in Washington state showed that 70 percent of the parents believed their children would want to go to college and

70 percent of the children indicated they were going to college. The facts do not bear out these figures. These youngsters will leave school with no skills; they will become sort of locked out. In other words, if a youngster is only 14 he cannot qualify for the remedial programs. So we are going to have to broaden this definition. We are going to have to involve English teachers in vocational preparation to some extent. If I had to name in order of priority the vocational skills that one needs in today's society, I think I would have to start with reading, writing, and arithmetic.

Mr. Lecht:

Some mention was made of new institutions in this area. Some of the occupations that have been growing most rapidly are the various technicians' occupations; electronics technician, medical technician; and some we have not given names to. I wonder if much of the kind of vocational education that these people require is a combination of basic science, mathematics, and English, that may be given most usefully in a posthigh school institution, particularly in a society where a lot of young people are now looking for some kind of posthigh school education.

Dr. Venn:

There is no question about that. In fact, data for the last two years indicate that the growth of postsecondary, technical education is more than double the growth at the high school level. But you must also look at the other side of it, which implies that regardless of how much mathematics and science a person might take, he is not going to become a computer operator, even at the key punch level, unless he learns certain specific skills that would go with these subjects. Many students that are now in the two-year college will move up into the four-year college. Hopefully, the day will come when all youngsters will be getting their occupational skills at the postsecondary level. But when a million and a quarter kids are dropping out of school, to simply say, "We'll make their high school interesting and keep them in school, and then put them in postsecondary schools," is simply begging the issue.

Dr. Hall:

I was getting the impression that a student going through a total school program--junior high, high, college, or whatever--would be in some way related to the job by his school. Something you said seemed to clarify this a little for me, that vocational education would need to relate itself to and work with the general education program. Vocational education might assume the specific responsibilities for developing the skill aspects as related to the job to be performed. I thought, perhaps, if you would elaborate a little on these two immediate goals, it might help me in understanding it. One of them was "providing information early enough to help them make a choice," and second, "work experience to those who need it for obtaining employability skills." Would you mind elaborating on those?

Dr. Venn:

I think that our youngsters do not have a chance to get occupational information in our schools today and I do not think they can get it anywhere else. Occupational information, as I see it, would not lead them to make a definite choice, in terms of a specific occupation, but lead them to a broad area of interest; thus, they would be able to explore with some reasonable understanding the different pathways that lead to some future choice. For example, at the junior high school level, it seems to me that you can talk about the medical field and the broad area of medicine so that a potential doctor, in the 7th grade, would have some understanding of this broad field and could gain the education related to it. This is the concept of occupational education. Students have to have some broad directions. The second area you asked about was work experience. We complain about the fact that vocational education does not have status. The statement, "Son, I hope you get an education so you won't have to work like I did," is known to all of us, implying that there is no relationship between education and work. Really the best statement is, "Son, I hope you get an education so you can work." What I am saying is, in an agricultural society youngsters have the opportunity of having some work experience, in terms of seeing themselves as contributors, having an economic role. More and more in our country, our youngsters are recognized as economic liabilities. In many families, the youngsters cannot see any real relationship between what they are doing in school and how this will help them get a job. I think we have got to develop roles--really begin to involve these young people in some of the tasks of society and give them a role that is significant. There used to be many ways that a youngster could leave school and go to work and get identity as an individual. It seems to me we have to tie some kind of work experience to the educational aspects of child development.

Dr. Hall:

What experiences of young people are we talking about?

Dr. Venn:

I would say, basically, three different kinds. One might be an orientational kind of work experience that would give some understanding of the different kinds of work. The next one might be general work experience, in which the student would work on weekends to give him experience. The third level, which comes a little later, would attempt to relate some work experience to a specific occupational goal. We could run a program like this in every school in the country during summers. We could even tie in certain kinds of work that youngsters get on their own, over weekends, and give them credits for it. It would not be hard to do--just require 18 or 22 credits to graduate--but give them credit for it and give them a mark. In the educational system, work has a role, and work is significant, but we never give any real credit for it.

Dr. Kelly:

In your statement of objectives, Dr. Venn, you said one of them was reducing unemployment. I thought the approach was to reduce it by developing skills or employability. I did not see anything mentioned about keeping children in school longer to reduce the supply of labor. Classically, in Western Europe and the United States, there have been two great motives behind child labor laws. One was humanitarian, and the other was to reduce the supply of labor and get some leverage to increase the price of it. I was struck this morning by the statistic that we have 12 to 14 percent of youth unemployed and I am led to the conclusion that employability is a function of age more than education. What we may be talking about is a question of labor supply and demand compared with jobs, and I am led toward a little different approach as to what to do with these people.

Mr. Swerdloff:

I think I take a little different tack than Dr. Kelly. I think the high unemployment of youngsters is caused by the fact that they are unemployable; they do not have skills that employers need.

Dr. Venn:

If we reduced this problem of underemployment, I have a hunch we would have a real tight market at the lower level. The labor force, essentially, is made up of many more unskilled than skilled jobs, and muscle power is still economically useful.

We have brought into this country many kinds of skills from other countries. We have always been stealing manpower in the technical areas, and I am not at all convinced that we ought to keep all these kids in school. There might be some better ways they could learn some things if it were tied up with the concept of continued learning, but we have got this term "graduation." You hire people because they graduate from Harvard. Well, if the guy is 40 years old, I doubt that it is what he learned at Harvard that is important; it is what he learned since he left Harvard.

Dr. Davie:

You identified the transition from adolescence to adulthood. This is a major problem in society. You also spoke about the transition from school to work and said that technological changes in our economy have complicated these two transitions. I wonder if there is not another complicating factor, and this is a change in the attitudes of adolescents, the culture of adolescents. Adolescents today, whether they are affluent themselves or are so affected by the prevailing affluence of our society, view work in a much different way than work was viewed in the past. If we continue to sell the idea of the job in terms of our past attitudes toward work, I think we are making a mistake. We need to sell work in terms of being a very important part of the full life of the individual. The adolescents I have run into as undergraduates have a much different attitude toward the world of work than even we did ten years ago. Vocational education has to adjust to this kind of change in society, as well as the technological changes, so that we get the idea across that work is important, not because you will satisfy the economy's demand for skilled labor, but you will be better able to satisfy your own notions about what the full, meaningful life is for you as an individual.

Dr. Venn:

I agree with that. Work really cannot be defined so much any more in terms of the input of muscles to move so many pounds, in terms of just production, because 60 percent of our labor force is in services and distribution. Work is not so much necessary any longer to provide food, clothing, and shelter as to provide a way by which the individual becomes contributory and expresses himself.

Dr. Davie:

Perhaps some of the specific skills for which we are still training people in vocational education are not thought of by adolescents as being contributory--it's just a drag.

Mr. Kotz:

I do agree with Dr. Venn and Dr. Davie that occupational education should be concerned with life adjustment and self-fulfillment, as well as vocational adjustment. I do believe, however, that work is still essential and important to many individuals to provide food, clothing, and shelter as a very high priority, as well as to satisfy the desire for luxuries, so that other aspects of a full life may be enjoyed. But when we pursue the different programs to achieve the objectives and goals that Dr. Venn describes or undertake research projects or demonstrations, we need to evaluate and compare different approaches to determine optimum courses of action. Which programs and demonstrations show valuable results, and which are marginal or inadequate and should be possibly discarded? Application of the PPB system can be of value here.

Dr. Bowen:

At IBM, we have difficulty finding trained people for PPB. Where would we obtain enough qualified people to perform the work if many of the states and communities decided to establish PPB systems? There just are not enough people around.

Mr. Kotz:

Some persons assume that everybody wants planning and programming to start and that they all want it to start at the same time. Some of the others here may not concede this, but for the moment let us assume that this is so. Some states and communities are moving already. New York City, for example, has just let a contract that will require a several-year joint effort with a research outfit in establishing a program budgeting capability in which Stanford Research Institute will help train the staff so that they have a continuing, ongoing capability once the research and planning project is over. The state of Pennsylvania has just let a contract in the same area. The city of Philadelphia is moving with yet another group to have a broad capability, not covering education alone, but all of their functions in the same kind of general direction. The planning and programming concept does not give you the universal-type man who can do all things, so you really require an interdisciplinary approach with a lot of skills. Some people in the field of economics have been trained in marginal utility analysis, and they feel that they have been doing benefit/cost type of analysis for a long time, and many can convert rapidly to these approaches. This is also an area for operations research analysts, systems analysts, and other professions and disciplines whose skills are transferable to many subject matters including education. There are private companies working both for industry and for government in which well qualified economists are doing just this sort of thing. Benefit/cost analyses, for example, have been developed by the Corps of Engineers. When it wants a waterway, the Corps submits justifications of economic merit to the Congress based on a presentation of all benefits and all costs. Proponents of railroads and other modes of travel may object to this, and they use economists to develop their competing positions. This is done in other areas, as well, so you probably have more skills around in terms of the type of people you want on an interdisciplinary basis than we are aware of. The Civil Service Commission has a number of training programs going throughout the country in which people have been and are being trained with this kind of capability.

A second major consideration is that no one claims that installing a PPB system makes the work easier. It may make it a great deal more difficult. It certainly should not be undertaken unless the head man or head committee intends to use the group for the job he wants done. Every State Director of Education and every community director in the large cities will not want to move at the same time. But there are additional resources available. Most companies or most state governmental agencies or municipalities wanting to establish PPB systems will not have the resources, and they will have to work with universities and consulting firms and the like, until they build up their own capability, but they should certainly never let a consulting firm do it all for them. It should be a joint effort with the research organization helping to train personnel selected to do the job, and to provide the continuity once the initial research and installation effort is over.

Chapter 5

EVALUATING VOCATIONAL EDUCATION: PROBLEMS AND PRIORITIES

By

Garth L. Mangum*

The problems of evaluating vocational education can be stated succinctly in two propositions, one factual and the other normative: (1) it is less than clear what vocational education is, what its goals are, how much of it there is, where it is given, what its content and quality is, who gives it, who gets it, what they learn, whether they use it, what good it does them, what it costs, how much is spent on it, and what its competitors are; (2) there is no consensus on what vocational education's goals should be, at what ages and in what types of institutions it should be given, what its relations with other forms of education and training should be, who should teach it, and who should take it.

Data Deficiencies and Needs

The first set of deficiencies is the easiest to describe and prescribe for. The data reporting system from which national data accumulate was not designed for evaluation but for financial accountability, and its original purpose was to provide evidences of state support to qualify for federal matching funds. It defines as vocational education any course that relies in part on funds from the various vocational education acts. Thus, Home Economics in 1966 accounted for one-third of total enrollment and one-fifth of the funds in federally supported vocational education even though its purpose is largely homemaking. Typing and shorthand became a part of vocational education when support for office occupations was written into the Vocational Education Act of 1963. Any subject that does not fit within the seven federal support categories or any school or course that does not rely in part on federal funds does not make its way into national vocational education statistics.

Since the states overmatch federal vocational education dollars four-to-one rather than the required one-to-one, it is generally believed that actual expenditures and enrollments are understated. On the other hand, enrollments include anyone who enrolled during the year, regardless of how long they remained and how many hours per day they spent. A high school girl taking two hours of cooking or sewing per week is exactly equal to the trade and industry student receiving three hours per day, the full-time postsecondary vocational student with 30 hours a week, the adult in an evening class, and perhaps even the policeman or fireman in a three-day orientation series. Nothing is known of enrollee characteristics except for sex and, for secondary school students, their grade in school. The quality of teachers, equipment, and course content are complete unknowns. The only measure of results is a report of uncertain validity from the vocational teacher in September reporting on the placement of students who completed his course the previous spring.

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These are only examples of data gaps, some of which may be filled in individual states and all of which could disappear with appropriate sampling and reporting techniques. For the present the lack of data, seriously handicaps the Advisory Council on Education appointed to review the results of the Vocational Education Act of 1963 and report with recommendations by January 1, 1968. The purpose of the 1963 Act, in addition to expanding total expenditures, was to stimulate vocational education to move in new directions with respect to clientele, types and location of schools, training occupations, relationship between training and the labor market, educational planning, program review, and research. No advance efforts were made to assure availability of data for the Advisory Council's assessment. How much the Council can accomplish remains to be seen. Perhaps one of its major contributions can be highlighting this almost complete absence of evaluative data.

The Goals of Vocational Education

Less easily solved than the absence of data on what is vocational education is the absence of agreement on what it should be. Even if one had data to demonstrate that the additional lifetime earnings of graduates of vocational schools were sufficient to represent a good return on the investment, little would have been proved. Are increased earnings the appropriate goal? If so, are there less costly or more effective alternative approaches to that goal? What are the opportunity costs? Could other more valuable goals have been achieved in the same time and with the same or less resources?

Agitation for vocational education in this country began with the industrial revolution and achieved its sanction in federal law concurrent with the manpower demands of the first World War. Training for trades and industry was overshadowed from the beginning by that for agriculture and home economics, perhaps in recognition of political realities, rather than need. Subsequent acts added distributive education, health occupation education, and technical education, each as an addition to rather than a replacement for the past. It is interesting to speculate how different vocational education might be today had it not been tied to narrow occupational boxes by the matching grants of the Smith-Hughes and subsequent acts.

The Vocational Education Act of 1963 made no changes in the assumptions and goals of the past. The criticisms by the Panel on Vocational Education and others that led to the Act were criticisms of the conduct rather than the nature of vocational education. An almost religious commitment that a voice from an educational Mt. Sinai revealed eternal verities in 1917 is evident in the following quotation from an as yet unpublished document:

> The need and nature of vocational education was considered carefully, and debated at length during the conventions of the National Society for the Promotion of Industrial Education, with the result that foundation principles began to emerge. Because this process was so thorough we are justified in holding the point of view that the *principles* of vocational education were formulated during the period 1906-1917, when these conventions occurred.
>
> The next step was to provide an interpretation of the principles thus established in a general context appropriate for all state systems of public education. The first *interpretation* of these *principles* occurred in the form of the Smith-Hughes Act in 1917. The principles were subsequently *reinterpreted* by the Acts of Congress in 1936, 1946, and 1963. . . . The principles are sound and *do not change* with time (Emphasis in original).*

The critics of 1962-63 charged only that (1) the curriculum had not changed rapidly enough to drop obsolete occupations and add growing ones, (2) there had been inadequate communications between the projectors of manpower requirements and the producers of manpower, (3) equipment had been allowed to become obsolete, (4) capacity was inadequate, and (5) various population groups were being bypassed. All of these deficiencies could be remedied without change of principle. The 1917 assumptions, implicit and explicit, were carried over into the new Act. All occupations and persons requiring or achieving less than a college degree are the legitimate jurisdiction of vocational education. Successful employment is the central goal of education. No student should leave the educational assembly line without a salable skill. Training must be for a specific occupation by an instructor with industrial experience. Vocational education has greater retention power for nonacademically inclined students, yet meets the needs of the highly qualified. Accelerating change requires constant return to the vocational school for skill refurbishment. All of these premises are evident in the following quotes from the same unpublished source.

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* Although this document is unavailable for attribution, it appears to represent the views of a group of prominent vocational educators. For evaluations by uninvolved but friendly critics see: Alice M. Rivlin, *Critical Issues in the Development of Vocational Education*, The Brookings Institution; Dale C. Draper, *Educating for Work*, National Committee on Secondary Education, Paper Number Two (Washington, D.C.); Lawrence J. Barnett, "Does Education for Work, Work?", *Urban Review*, May 1966; *Summary Report of The Summer Study on Occupational, Vocational and Technical Education*, July 6-August 13, 1965, Massachusetts Institute of Technology; Susan Savage, *The Political Economy of Vocational Education*, Bureau of the Budget, September 1966 (mimeo.), Washington, D.C.

> In its broad sense vocational education is concerned with all people and all jobs. In its more limited sense vocational education, as the term is customarily used, focuses attention upon the educational needs of 85 percent of the labor force . . . work is infinitely precious to the person . . . his occupation will occupy a major portion of his day and will color or influence his entire day-to-day existence . . . . The key to this relationship is education, especially vocational education.
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> Vocational preparation of all students, both boys and girls, and those with special needs, is a responsibility of the school. Some students will elect to enter the labor force upon graduation, or before, and the school must take steps so that he does in fact enter the labor force under the most desirable circumstances as far as educational preparation is concerned. No student, either by drop-out, push-out, graduation, or transfer to another institution to continue his formal education should be permitted to leave the environment of the secondary school until the student, the parent, and the school are satisfied that realistic vocational choice has been made.
>
> Although the school is concerned with occupational preparation of in-school youth, it has an occupational obligation for another group--the out-of-school youth and adults . . . . The best evidence in looking toward the future suggests that the 70 million members of the labor force will return to school in order to maintain occupational mobility. A major portion of this group will knock on the door of the public school. The school after dark will be larger than the day-school.

Although these propositions are articles of faith to vocational educators, most of them could be challenged by critics from outside the system. According to a now well-known Department of Labor survey, only three of ten of the current noncollege trained labor force have any formal training for their present job.[29] Of those, 40 percent gave high school as the source of their training with the remainder identifying special schools, the military, apprenticeship, company schools, correspondence schools, technical institutes, and junior colleges. There is no way of determining the extent or kind of training. However, it is likely that vocational education could claim to be occupying no more than 15 percent of its claimed jurisdiction. Leaving out home economics, enrollments in secondary level vocational classes, including office occupations, was 12 percent of total high school enrollments. Total enrollment in federally supported vocational education has increased substantially. However, office occupations were added in the 1963 Act and probably constitute only a shift from total state support. If one subtracts office occupations from the 1965 and 1966 data, the rise is on a trend line extending back through 1961, which is not increasing more rapidly than total high school enrollments.

Substantially greater numbers could doubtless profit from expansion of vocational education. Yet a low proportion of those who are trained in high school for particular occupations ever enter those occupations, fewer remain in them, and perhaps even fewer should. The average high school student has too little knowledge of his alternatives, interests, or capacity to make a lasting vocational choice. With vocational education costing from one-third to one-half more than the academic or general high school curricula, the low retention has serious cost connotations.

There should be little argument against the proposition that every labor force entrant must have something that is attractive to employers. The questions are what and how best to obtain it. The conviction of vocational educators that their product is the answer to occupational preparation is understandable but subject to challenge. The question is primarily one of opportunity costs. One of the few studies of the comparative results of high school level vocational education and general education found, using income as the criterion, that a sample of trade and industry graduates led a similar sample of general education graduates and maintained their lead for six years after which the general education students caught and passed their vocationally trained fellows.[30] Both samples, however, represented only the output of the two types of schools as they currently were. Sandwiched between college preparatory courses and vocational education, general track is often education in pursuit of nothing. Given its high costs and the difficulties of recruiting and retaining competent staff and maintaining up-to-date curricula and facilities, the quality of vocational education in the high school is often doubtful as well but at least it has a goal and purpose.

To test whether vocational education or some alternative form of occupational preparation is the best investment, one would have to subject comparable samples of potential labor market entrants to the full variety of alternatives each in its ideal or at least comparable state. Does the student do better in the long run who attends a vocational high school, receives vocational training in a comprehensive high school, pursues an academic course, or who, having comparable ability and in otherwise comparable circumstances, simply drops out without completion?

Included in the calculation should be any additional noneconomic benefits obtained from one form or the other of education and training. If the additional investment in time and money is included, does postsecondary vocational and technical education or apprenticeship add to the benefits sufficiently to justify the costs in relation to other sources of occupational preparation? It is probably safe to conclude that the questions have never been answered, even if asked.

The alleged higher retention rate of the nonacademically inclined in vocational schools has been a frequent argument for its expansion in recent years. That it is so is unproved, but whether or not vocational education better serves the hard to educate, it is clear that it does not do so by choice. Vocational educators have always decried their use as a dumping ground for other people's failures. They have not enthusiastically welcomed the educationally handicapped.

Even if vocational education could be demonstrated to have a better retention rate than general education, the fact might argue as much for improvement of the latter as the expansion of the former. The bookish formal classroom is not the only way to impart general knowledge. Vocational education's methods, rather than its content, may be its strength. The Pre-Technical and Project Feast programs financed by the Ford Foundation in the San Francisco Bay Area have demonstrated the potential for building a general education curriculum around a manually oriented core as an attraction to undermotivated students. Both have also demonstrated the eagerness of employers to employ well although generally trained graduates.

The notion is widespread that workers become displaced and require retraining more frequently in the present than in the past. There is no measurement of either past or present rates of skill obsolescence and, therefore, no base for projections. It can probably be shown that employed workers profit from their part-time upgrading efforts and that the opportunity costs are usually only alternative uses of spare time.

One of the historical deficiences of vocational education has been its failure to offer training to those who were competitively disadvantaged in the race for jobs, yet unqualified for training by reason of their deficient education. Until recently, vocational educators could not be criticized for this gap because they had been given neither the assignment nor the resources. However, despite the directive of the Vocational Education Act of 1963, only some 3 percent of vocational funds are currently spent to meet the needs of the competitively disadvantaged. In a world of rapidly growing educational attainment, not only the recent dropout but also the older worker whose education was sufficient for his time are left behind, yet vocational education has been aimed at the competent high school student and the qualified adult. For high school students without adequate general education skills, it has provided a nonremedial holding action; the unqualified adult it has simply ignored. In the long run, it is likely that one of the most significant contributions of federally supported manpower and poverty programs will be the leverage they have exercised on vocational education to serve a hitherto neglected population, adding prevocational orientation and basic education as an integral part of the curriculum. So far, however, the Job Corps has been looked at as an unneeded competitor and MDTA as simply another chunk of vocational education money over which the federal government insists on exercising undue control.

Issues in Vocational Education

The issues in vocational education remain remarkably stable, suggesting that many of them are based on irreconcilable value judgments. Others remain unresolved for lack of data, research, or resources. With pressures for educational expenditures rising, should scarce dollars go into more expensive vocational education or less expensive general education? There appears to be a trend in several states toward emphasizing vocational education in postsecondary institutions. Such a move would be likely to pay off well on benefit/cost grounds, since costs in relation to quality would not be greatly affected, while the greater stability of more mature students capable of more durable vocational choices should increase the benefits substantially. The potential losses from transfer of vocational education to the postsecondary level are two. First, to the degree that one considers wage benefits only, using 14 years to prepare for an occupation attainable in 12 years or less may be costly. However, if the general education benefits are added, including possible improvement in employment stability and retrainability, the payoff may appear quite different. Second, to the degree that vocational education has greater retention power than general education, the high school dropout rate might rise, whatever its consequences. On the other hand, improved techniques of general education (perhaps using vocational education methods for general instruction) may build equal or greater retention power along with the benefits in humanity and flexibility usually considered to be among its advantages. However, emphasis on postsecondary vocational education will require assurance that such offerings are generally available and not limited to junior college students.

All of the issues involved in relating training to the labor market remain unresolved. The 1963 Act directed cooperative relationships between Employment Services and vocational schools to improve and make available information on the skills demanded currently and in the future. Little, if any, progress appears to have been made. In addition, there is no agreement on the period of foreknowledge required and the appropriate choices between training for local, regional, or national demands. A related issue is the political bias, strengthened by use of industry advisory groups and likely to be perpetuated by employment service participation, toward serving the needs of the employer and the labor market than those of the student and potential employee. In addition, the continuing problems of obtaining adequate staff and remaining abreast of facilities and equipment needs have not been solved.

At the same time, new issues have arisen that relate particularly to the newly recognized needs of disadvantaged groups. Vocational education is of notably better quality in medium size cities than in either rural areas or large cities. In the former, the population is usually too small to support separate vocational schools, and high schools cannot afford to include a wide selection of vocational courses. Where segregated schools have been the historical pattern, facilities for minority groups were simply never built. The suburbs of large cities are often too college-oriented to care about vocational offerings, while the poorest facilities, curricula, equipment, and staffs and the greatest gaps between offerings and labor market realities are found in central city slums. Except to the extent it has been bribed to do so by MDTA and similar programs, vocational education has done little for those described in the 1963 Act as having "academic, socioeconomic, or other handicaps that prevent them from succeeding in the regular vocational education program." MDTA administrators have increasingly found it necessary to go outside the regular vocational schools and establish "skill centers" where basic education and prevocational preparation can be added to courses shaped to the needs and abilities of the disadvantaged. The Vocational Rehabilitation program makes little use of the public vocational schools, having found them unwilling or unable to give adequate training to the handicapped.

The debate over separate versus comprehensive high schools continues, although with most points apparently going to the latter. Some cities such as New York have resolved to eliminate separate vocational high schools, not only because of the difficulty in maintaining quality standards but because of the social connotations of cutting students off from broader social and academic exposure. They soon discovered, however, that they could not afford to provide in every high school the full range of training opportunities needed to offer the student freedom of occupational choice. There is probably no such thing as a truly comprehensive high school today, and, given costs, it is doubtful that they will ever be widely distributed. Area vocational schools serving numerous high schools and "cluster schools" providing the desired comprehensive offering by integrating the curricula of a number of closely located schools have been advocated as answers. However, they are also expensive and they do not solve the problem of a separate stream for vocational students.

At best, vocational education is one of several alternative methods of skill acquirement. Because of the high costs of vocational education and the concern with finding jobs for the disadvantaged, new emphasis is being placed by policy-makers on encouraging on-the-job training. Placement precedes training; the cost of duplicating the employer's equipment and keeping up with technological developments is avoided. Since vocational education is, in a sense, a 100 percent subsidy of the employer's training costs, partial subsidies for on-the-job training through tax incentives or similar devices are used abroad and frequently advocated here. A reemphasis in MDTA from institutional to on-the-job training with subsidies aimed more at allocating employment opportunities to the disadvantaged rather than expanding total training has been widely resented by vocational educators and suggests their reaction to more general subsidization.

A Personal Evaluation of Vocational Education

The Vocational Education Act of 1963 did little to reorient vocational education. How much it did for expansion is yet to be seen. Leaving aside office occupations that were probably financed by state and local funds before federal support was opened to them, total enrollments are on a trend line extending from 1961 through 1963. Home economics rose through 1965 but declined slightly in 1966. Agriculture continues to rise slowly with distributive occupations and trades and industry carrying most of the growth. Technical education is rising slowly, and health education somewhat faster. Relations between employment services and vocational educators have improved little. Emphasis on area schools tends to perpetuate the "separatist" nature of vocational education. Training for a specific occupation and use of only industrially experienced instructors are required, impeding more experimental approaches and encouraging early vocational choice with its high cost consequences for the system and the individual. Expenditures for training those with special needs remain insignificant. There is no evidence of a significant impact on employment prospects.

Despite good intentions and four years lead time, no significant advance preparations were made to facilitate the evaluation report required by January 1, 1968, and assigned to the Advisory Council on Vocational Education. The results may appear discouraging, but Congress did not vote the necessary funds until 1964, and two years is a very short time in vocational education. Expenditures have increased substantially but most of the funds have been going into new facilities, suggesting the possibilities of future expansion.

The quality of vocational education ranges from excellent to abysmal. In general, quality follows the dollar with good vocational education in the same communities that have good general education. Since the reverse is also true, the relative quality of the alternatives tends to be uniform. Given adequate funds, vocational educators generally seem to know what they are doing and offer high quality training to the population they serve. Since they receive their support and advice from local industry, the occupational offering is locally oriented but most students do not migrate, and the communities that have good vocational schools tend to have well-diversified economies. With one exception, the greatest deficiencies appear to be in the communities of greatest need. That exception is the community where the majority of students are college-bound, and there is insufficient public pressure to provide facilities for preparing the minority who are school leavers.

The rural areas with the highest migration rates tend to be those with the least ability and willingness to support good schools. The scattered population contributes to a high per student cost for vocational education and, outside of agriculture and home economics, it is difficult for school administrators to judge the occupational destinations of their youth. The abysmal in vocational education is found in the inner city slums where it appears to have the most to offer. Where the gaps between the home, the school, and the job are the widest, the bridges are the weakest: the most depressing facilities where motivation appears to be weakest, the poorest teachers where the task is toughest, and the most obsolescence where the jobs are hardest to find. Often there are simply no schools with substantial vocational offerings.

The same can be said of the services of vocational education to the out-of-school adult. Extension courses are more often available to the skilled employee wanting to increase his skills or knowledge over time than to the unemployed worker who needs to enter a training course now, not next September, and be prepared briefly and intensively for a return to remunerative employment. The recent dropout, those whose education has become obsolete, and those who have been out of the labor force often need basic education and a period of orientation to assist them in choosing a training occupation and preparing to function in a complex labor market. These are being provided by various manpower programs, each of which uses the vocational schools, but comes bearing nearly 100 percent federal funds to buy services that were not available under regular vocational courses.

Beyond these failures to serve the disadvantaged adequately, the most important questions are those concerning opportunity costs. There are only so many hours in a school day, and every subject taught is another ruled out. What does the vocational student forego for his training? The needs of individuals differ, but mass production techniques are cheaper and therefore attractive to the public and the school administrator. The goal should be to maximize the options open to each. Accomplishment of this goal will vary community by community over time. Funds are never unlimited, and priorities are necessary. Vocational education in the high school is high cost education. The opportunity costs at the point where education has the obligation to prepare citizens and human beings are also high. The student has little experience on which to base an occupational choice, and many will find the offering or their choice to have been unsatisfactory. Yet the student leaving school must be able to compete in the labor market.

It is believed that retention can be higher and costs lower if high schools stress their general education role, using where necessary the techniques, but not necessarily the content, of vocational education as a motivating core around which to mold the maximum acceptable body of general education. Since employment is one of the most important aspects of life, the earlier the concepts of work and employment can be introduced the better, with exposure to the alternative choices available through individual capacity and economic reality made available to the student before premature inclinations are developed or decisions made. Increasing numbers will choose a college education and, until they become a sufficient proportion of the labor force to make the quality of their education an important competitive factor, there is little need to worry about their futures. There is undoubtedly considerable waste in overpreparation for the job content of many jobs that are thought to require college education. However, educational attainment is a convenient selection device for lazy personnel men, industrial engineers, and employers, and, with an increasing body of more highly educated persons to choose from, there is little reason or likelihood of them adopting more sophisticated techniques. For the remainder who will remain the majority for some time in the future, the high school must accept a new responsibility to see the student safely into the next step of a career instead of dropping him into an unfamiliar pool from which he must scramble the best he can. To do so will require working closely with employment services and employers to ensure access to jobs and with the community colleges and technical schools to keep the career channels open if motivation is stimulated.

To make such a philosophy operational, each community will need postsecondary education and training facilities open to all and not just to high school graduates, combining the curriculum of the community college, the technical school, and the postsecondary vocational school with the MDTA skill center's advantages of immediate enrollment, remedial education, short as well as long term courses, and income maintenance. However, such institutions will need to be flexible and individually oriented and supplemented by cooperative work study, on-the-job training, and other alternatives. Fortunately, the net effect of diverse movement appears to be in the right direction. Nothing can be evaluated until tried, but there appears to be no reason to expect costs to be higher or benefits less than those of traditional approaches.

Discussion

Mr. David Bushnell:

In trying to take a position in response to Garth's eloquent and searching examination, I find myself in a dilemma. Garth seems to have the problem of mixing fact and opinion, and I have difficulty in sorting out the two. I cannot resist, however, commenting on his concern that there is not going to be many good data for the ad hoc advisory committee to examine in preparing their report as a critique of the Vocational Education Act of 1963. I think there are some good data available. Garth may not be aware of some ongoing studies, some of which will be completed in a month or two and some of which are designed for the purpose of getting at the baseline information that is needed to establish what is happening with the investment in the vocational education field. Let me just cite two or three of these to lend some credibility to my observations.

First, Bruce Davie has completed a very worthwhile study in looking at already existing information that does come into the Division of Vocational-Technical Education, and he has drawn some rather searching conclusions as a result of manipulating those secondary data. What he has been able to do is suggest that some of the directions that we are going in need modification in terms of what are the types of investments being made by states in traditional areas as against the newer areas.

Another study under way at the University of Illinois is gathering some basic data on work study programs. Admittedly, there is not as much factual and searching information as we would like to have. Many of these are nonreimbursed programs. At the local level, we have a study,which will be completed in June, that will consider the students enrolled in work study arrangements at the high school and postsecondary level.

We have a third study under way at the Institute of Social Research in Washington, which is trying to assess where we get our vocational teachers from, how many there are, what quantity of education are they getting, and what are their attitudes about their roles in contrast to those of teachers in comprehensive high schools, junior colleges, and elsewhere. We include this in a research program for the purpose of trying to anticipate the types of questions that the ad hoc committee would be raising. As our program was started two and a half years ago, we set as our No. 1 priority area the problem of evaluating vocational education. Before I go on to talk about some of the issues, Dr. Arnold, are you ready to discuss some of the factual matters that Dr. Mangum has cited? If so, I will yield the podium to you.

Dr. Arnold:

Dr. Mangum has made a good point about the lack of at least certain very important data that we have never collected in vocational education. We are wrestling right now with what kinds of data are required and how we should go about getting them. The kinds of information that are being asked for now are voluminous and extremely detailed. We are asking the 50 state directors this week whether they have it (we know they do not have it all), and if they had it, what they would do with it. What could planners do with all the kinds of information that are being requested?

Let me give you a vocational educator's point of view. We are concerned immediately, today, next week, and next month, with a multimillion dollar program that has been largely specified by Congress. Dr. Mangum has rightfully approached this question from the standpoint of: Is this the right thing to do; is it the best thing to do? The important question, it seems to me is: How well is vocational education being performed? How well are those purposes being carried out? How efficient is the operation at all levels? How effective is the instruction?

Let me paraphrase here from Section I of the present Act: It is the purpose of this Act to maintain, extend, and improve existing programs of vocational education, to develop new programs of vocational education . . . so that persons of all ages, in all communities of the state, will have ready access to vocational training or retraining. This is the fundamental purpose of the Vocational Education Act of 1963, and as Dr. Mangum has said, it reiterates what was said before.

The second most important element is found in Section 8, which states: "The term 'Vocational Education' means vocational or technical training or retraining which is given in schools or classes, including field or laboratory work, under public supervision and control, or under contract with a State Board or local educational agency . . . (and here is the important clause) and is conducted as a part of a program designed to fit individuals for gainful employment as semiskilled or skilled workers or technicians in recognized occupations."

Where we get into the difficulty is this resolution of the issue of this charge. Last weekend at a meeting of the National Committee for the Support of Public Schools, the issue was raised of coordinating the general education curriculum with the vocational education curriculum, kindergarten through grade 14. These are really opposite ends of a continuum, and it seems to me that there is a basic issue, on the one hand, of training people in so-called recognized occupations for a specific job or job family, and in training people to meet the many other objectives of education that Arnold Kotz identified in the multiple categories set forth in his paper. Such objectives include education for participation in a democracy, preservation of our cultural heritage, and other outcomes not measured solely by placement in a specific job. Socialization objectives of reducing social tensions and developing one's capacities and personality to the fullest are others that are not easily measured in tangible dollar benefits. They may conflict with objectives whose attainment can be measured in dollar benefits and dollar costs related to specific jobs.

It is essential that we concentrate on resolving some of these basic issues. I could speak to the point of some of the deficiencies that Dr. Mangum spoke of, especially in the big city problem. I think there is much to be said about the deficiencies in the program, both in the rural areas and especially in the large city areas. We are suffering from the deficiencies of education in general, as well as deficiencies in vocational education. I would say that it is extremely difficult to lay all of the ills of vocational education at the door of vocational education. It is a fact that the Smith-Hughes Act was rather narrow in its concept, as are other subsequent Acts, including the George-Barden Act. However, the panel of consultants showed that less than 7 percent of secondary school students in 1961 were getting any kind of an occupational training opportunity for gainful employment, so it seems to me the problems are much deeper than Dr. Mangum points out. Perhaps the solution is to find a harmonizing point on the continuum between training for the so-called recognized occupations, either specific or in a cluster, as against a very broad curriculum that is presumably integrated or coordinated in kindergarten through grade 14.

Mr. Bushnell:

I am going to make just one or two quick comments. There are two issues that Garth has pointed up that we feel very concerned about--one is the expansion of vocational education and all of education to meet the needs of disadvantaged students in the urban slum areas, as well as to meet the needs of the noncollege-bound youngster. There has been considerable discussion on the fact that only about 20 percent of students at the high school level actually go through to get the baccalaureate degree or higher. It is the other 80 percent that we are concerned with, those that should have some kind of meaningful, occupational preparation as well as the development of learning skills, problem-solving skills, and adaptive skills that allow them to enter into their role not only as workers but also as citizens and satisfied individuals. The whole question of how do we orient ourselves to this broad population runs afoul of the problem of subpopulations. The MDTA skill centers and the vocational rehabilitation programs that Dr. Mangum feels are good models focus on a selected number of people. The vocational rehabilitation group takes 17-25 year olds with physical handicaps and tries to give them physical therapy. They support a wide range of medical examinations and corrective treatment. They move on to try to identify individual skills, individual skill training needs, and to look at the whole problem of remedial training from the standpoint of the individual. It is a very small program, however, and I would not want you to go away thinking that they have achieved great success in terms of the broad population of students I have mentioned--the 80 percent of the total enrolled student body in our high schools. The approach they take of individualizing the attention to these student needs has some validity, but it is very expensive. If you would look at the cost of this kind of treatment, you would find it prohibitive.

In terms of the MDTA skill center model, I am rather pessimistic about that. Again it focuses on a small segment of the population--those who are unemployed, those who are unskilled, those who need literacy skill development, and those who need to develop a far greater ability to enter the world of work with their peers, to communicate effectively, to accept supervision, and get to work on time. This special population, while it has been the recipient of considerable attention of late, has not responded as well as we might think. There is a good deal of evidence appearing now, through evaluation programs, that we are still failing to motivate these people to the point where they are able to advance further than the entry rung and climb a career ladder and qualify for better jobs in terms of income and greater responsibility. To say that the MDTA skill centers are succeeding in offering remedial help in basic education and meeting the basic education needs of these persons is not correct. The centers are wrestling with the problem. It is an experiment that is a useful one, one that ought to be continued, but there are many kinds of resources and kinds of learning and motivational techniques that have yet to be discovered in working with this small segment of the population. Let me just say that we are trying to devise, in the Office of Education, an approach that is systematic, which will hopefully modify the curriculum, train the teachers, and design better and more effective administrative arrangements to meet the needs of a broad cross section of the school population--recognizing that these various subpopulations may require help in differing ways. To cite some of the goals of that major effort, we are trying to bring vocational and general education together in an effective way, so that trainees may get basic learning skills, reading and writing, and problem-solving skills, in addition to those that would qualify them to enter into a job and to advance in that job. We are also hoping to use the motivational pull of vocational education. For many students who do not see themselves as academically bound, we would like to build on that kind of vocational interest that many of them have, in such a way that we use it as sugar-coating on the learning pill. We are trying to design a curriculum that focuses on a cluster of jobs, rather than specialized training for one job that may become obsolete in a short period of time. We are concerned with making students aware that they are going to take on a variety of occupations, not just an entry level occupation, but have to continue on to qualify for a number of related areas of employment. Hopefully, they will be able to climb the career ladder to compete effectively in this period of changing opportunities.

There are a few other issues I wanted to talk about. Let me just mention the issue of postsecondary education. True, there is seemingly a ground swell of support for putting most of the vocational education at the postsecondary level. I think this is being supported in ignorance of the fact that most students now do not go beyond the high school level. There is an attempt to proliferate junior college and community college programs, and these are very useful for those who want to enter a technician level of occupation. But it is still true that only a relatively small percentage of the student population goes beyond the high school level. Those who cannot afford to go beyond or who are not motivated to go beyond should have the kind of experience and the kind of educational fare that will let them find jobs and be productive. At the same time, we would like these students to be able to come back at some point in time to continuing evening education programs so that they can persist in their own self-development, have a number of options open to them, and be able to qualify for those options. When they finish high school, they can go to work or continue their education and go on to a community college if they wish to do so. Later, perhaps, they could even qualify for a four-year college program. There are a lot of other issues that we could talk about, e.g., teacher recruitment and training.

Let me conclude my remarks by saying that resulting from much of the research that we have supported to date is the significant fact that our major problem in relating effectively to the needs of the disadvantaged seems to be with the attitudes of teachers. The question then is how do you get at these attitudes, many of them reflecting middle class values that are not appropriate for children from disadvantaged backgrounds. If we can devise a technique for modifying these attitudes and developing better teaching methods for these teachers, we think we can create a far more rewarding learning environment in the schools themselves.

Mr. Kotz:

It is still some time until the report on the evaluation of vocational education is to be presented to Congress by the Vocational Education Advisory Council. I would say that we are having a useful exchange. The data and research results referred to by Dr. Arnold and Mr. Bushnell should be pulled in from the states and communities and provided to Garth and other members of the Advisory Council by USOE so that they can be examined and used in the preparation of the final report. Perhaps this meeting will contribute to that purpose. However, evaluation is only one aspect of the vocational education management cycle that concerns us.

One of the basic mandates in terms of the Executive Directive on PPB from the President to the federal agencies is that they look at the objectives and the programs broadly, so that the conduct of vocational education pursuant to one, two, or three pieces of legislation geared to one department alone would not be the appropriate perspective. We would have to look not only at the Vocational Education Act of 1963, but also at the legislation affecting the Department of Defense, the Department of Agriculture, the Office of Economic Opportunity, and the Department of Labor in terms of their contributions to the achievement of national, state, and local goals. The various trade-offs and ways to achieve such goals also require examination, from the perspective of the government, the states and local communities, and many national and local groups, including employers, unions, ethnic groups, and community action groups. If we could broaden the horizons to look at resources to get the job done, regardless of agency source, and look at some of the trade-offs that we have discussed in terms of the end products, we will be more in keeping with the discussion of the PPB concept and any broad planning and programming concept. All of the Acts affecting the purposes, therefore, are germane to this discussion. Now, questions from the floor or comments?

Mr. Righthand:

I would like to respond as a state representative of vocational education to Dr. Mangum's presentation. There is a great deal that I agree with. I agree with Dr. Mangum when he criticizes the data reporting system of the U.S. Office of Education, but I disagree when he quotes the very system that he criticizes. He says that only 3 percent of the funds were used for disadvantaged youths. Our reporting procedure was to report only those programs that were specifically set up for disadvantaged youths. This procedure ignores the youths that are being served continuously in existing vocational programs who are disadvantaged, and in the special programs we have set up for disadvantaged youths that we do not report to the U.S. Office of Education under existing reporting requirements.

There is a question here from the behavioral point of view. Is the right way to treat these youths to set up a special institution for the potential dropout? If we provide funds to the local schools to train gas station attendants, I can guarantee that 85 to 90 percent of those youths will meet whatever criteria you have for disadvantaged youths and be reported, because we will report this as a program in an industrial field. But would that be good? I think, Dr. Mangum, that you have a tendency to be too narrow in speaking of vocational education. You point out how few things there are and you are limiting your view of vocational education to what takes place at the secondary level. Then you say, "and look at all the other programs; e.g., MDTA." I always thought MDTA was vocational, as well as apprentice training--in our state it is. I'd like you to speak to our recruiters from industry in Connecticut. We have to keep them out of our schools, sometimes, because they steal students right out of the senior class.

There are many diverse approaches that we use, and we are not limited to high school programs and technical institutes as part of our vocational program. As for Dr. Mangum's criticism of the relations with employment services, a year and a half ago I would have agreed. But now encouraging things are happening. We did not like these area surveys, we could not use them, and we could not get the Department of Labor to move. MDTA follow-ups that you seem to know about, we still do not know about. We do not even know what happens to a youth after he finishes a program. Does he get a job? We read it sometimes in the newspaper when he does not--when there is a fuss raised--but otherwise, we don't know. The feedback was terribly inadequate. But we formed a combined committee and we are working out a technique of communication, follow-up, and evaluation. We also have had three different occupational studies done by the Department of Labor in a meaningful way so that we can use them.

MDTA is our responsibility; 85 percent of the programs in MDTA are being conducted through vocational schools. There is another question I would like to ask: Dr. Mangum, you quote the Department of Labor as saying that only three out of ten entering the world of work had formal training below the college level. Does this imply that formal training is needed for all levels of occupations? It looks like a very sad picture--three out of ten. But is it really? What is the formal training you provide to future policemen, firemen, and truckdrivers on a high school level?

Mr. Michael:

As one who has spent about a year and a half looking at the data on vocational education for Dr. Arnold in the evaluation area, there is one statistic that stands out in my mind as being characteristic of the whole program. That is, what has been done seems to be pretty good. It is what has not been done that is the problem. When you look at what has been done (this statistic has not been published yet, but I suspect it will be pretty soon) take a look at what it reveals. The new reporting system allows for data on completions and information on follow-up, at least to initial placement. There are certain problems with the data, but they are good enough to permit a feel for what is going on--and one of the things that interested me was to find out that the unemployment rate of those people who completed vocational programs was more like that of the labor force as a whole; it was more on the order of about 4 percent. These are basically secondary students. If you look at the unemployment rate for that same group and the population as a whole, which includes the vocational students, it was about 12 percent this year, and higher in previous years. Vocational education comes out well in this comparison. I think this is probably one of the most significant findings that has come out of the annual reporting system. This is one of the few output measures that we have that indicates that at least the system as it is operating seems to be doing a pretty good job.

Mr. Tuma:

I would like to pursue one point just a little further. Of the two portions of the Act that Dr. Arnold read to us, one is rather clear and self-contained and seems to come out of the earlier portion of the legislation. The other is the new and broader concept of vocational education as some of us would like to address ourselves to it. But basically, should we be concerned with occupational training in the broad sense? Or should we be concerned with something that goes even beyond the confines of the Vocational Education Act? Or is our proper concern that part that emanates out of the Smith-Hughes and George-Barden Acts? This is the one area I am confused about.

Dr. Arnold:

As you analyze the Act, another way we say it is that there is scarcely anything that you cannot do under this Act in terms of an employment objective program for the nonprofessional jobs. Dr. Mangum has given a very good critical view of some of the things that are not being done, but there are a tremendous number of things that can be done and are beginning to be done under this Act. I think that Section 1 is the broadest expression of philosophy of education of any piece of federal legislation for education. If you read it and analyze it, I do not think you can find a more eloquent statement. I would simply say that we think it is a tremendous subject, and I am not sure we have control of it. But again I would say that we are trying to keep our eye on it.

Mr. Kotz:

I think if you wanted a broad interpretation of the legislation, you would base it on Section 1, which states:

> It is the purpose of this part to authorize Federal grants to States to assist them to maintain, extend, and improve existing programs of vocational education, to develop new programs of vocational education, and to provide part-time employment for youths who need the earnings from such employment to continue their vocational training on a full-time basis, so that persons of all ages in all communities of the State--those in high school, those who have completed or discontinued their formal education and are preparing to enter the labor market, those who have already entered the labor market but need to upgrade their skills or learn new ones, and those with special educational handicaps--will have ready access to vocational training or retraining which is of high quality, which is realistic in the light of actual or anticipated opportunities for gainful employment, and which is suited to their needs, interests, and ability to benefit from such training.

But if you wanted to be restrictive, you could go to Section 8, which states:

> The term "vocational education" means vocational or technical training or retraining which is given in schools or classes (including field or laboratory work incidental thereto) under public supervision

> and control or under contract with a State board or local educational agency, and is conducted as part of a program designed to fit individuals for gainful employment as semiskilled or skilled workers or technicians in recognized occupations (including any program designed to fit individuals for gainful employment in business and office occupations, and any program designed to fit individuals for gainful employment which may be assisted by Federal funds under the Vocational Education Act of 1946 and supplementary vocational education Acts . . . .

The latter section would limit vocational education to the activities under the jurisdiction of state boards of education and public shcool systems, or those under contract to them. These may raise problems with MDTA, economic opportunity, and other public or private programs that use the public institutions in some situations and may go outside the public institution in others. And right here is the heart of a major issue that needs rigorous examination. Is preparation through occupational training conducted with public funds in whole or in part under the aegis of a private industrial company for the MDTA program to be considered vocational education within the meaning of the Vocational Education Act? If not, is the definition in Section 8 too restrictive? Should perhaps the definition of vocational education be broadened to include all occupational education conducted with public funds? Should it be further broadened to include all occupational education and training regardless of the source and length of time for training? Or can a useful distinction be made between occupational education and manpower training, with the former term defining longer term formal educational programs that are broadly gauged along the lines indicated by the Bushnell-Morgan paper, and perhaps the latter used to identify training for some shorter range program of a few weeks or a few months designed to equip an individual for performance on a specific job. The training then would be narrowly gauged, and the education would be more broadly gauged. Much more explicit attention than has hitherto been given to these issues is required, with a careful assessment of the advantages and disadvantages of alternative treatments and trade-offs. I do hope we have some more discussion of these issues at this conference.

Dr. Arnold:

There is a hazard in that Act, as there is in any, in picking out specific things, as I did, except for Section 1. When you read the whole Act, then I think the concept of the purpose of the Congress is quite clear, and it does lend itself to a broader rather than a restrictive interpretation.

Mr. Worthington:

Two things I would like to react to--Dr. Mangum said that the expansion of the program since passage of the Act has been very little. The funds were not appropriated until October 1964 and in the case of our state, we did not really get started until the school year of 1965-66. I think it is pretty much true, nationally, lead times being what they are, that you are looking at what has happened in one school year. We are now only in the second full school year under the Vocational Education Act of 1963. It would be difficult to make any broad generalizations on expansion, the actual time being so short, relatively, since passage of the Act. Another thing, in our state we have had some of the oldest area vocational schools in the nation, e.g., the Middlesex County School System was established in 1913. This school has had to turn down 60 percent of the applications of high school students because it did not have the space. Until Middlesex gets its new facilities built, it will not be able to take care of the young people who want to get into the school. There is another point that Dr. Mangum made that really needs some research. Based on my observations of thousands of students in all kinds of communities in the Midwest and the East, I believe that vocational education at the secondary level contributes to the retention power of the school. When a youth becomes goal-oriented and has an objective in school through vocational education, he is more apt to stay. I think in Dr. Mangum's case, he said that he was trained as an aircraft mechanic and got nothing out of it. He might have become a school dropout and might not be an economics professor today, if it had not been for that course. I think a lot of youths have been helped and encouraged to stay in school because of vocational education, and this could be documented.

Dr. Thomas:

I thought the most important question that Dr. Mangum raised was the possibility that the methodologies used in vocational education were its greatest strength, but that the present content was pretty dubious. I would like to have Mr. Bushnell respond to that, and Dr. Mangum too, and defend, or justify, the content still being valid.

Mr. Bushnell:

I would agree with Dr. Mangum that much of the methodology of instruction currently in use is appropriate to the needs of a noncollege-bound student.

Dr. Mangum:

I would say appropriate to all of them, and for college-bound students too.

Mr. Bushnell:

The methodology is appropriate to both groups. Certainly, to those students who are not verbally skilled and who cannot read well, it makes more sense to be able to work with one's hands, to manipulate objects, and to develop one's mathematical skills. In our attempts to identify the important instructional techniques that vocational educators use, these seem to be the kinds of practices that are viable. You can name others: the individualized attention that they get from a sharp instructor, the relevance of the material being learned to their areas of interest, and the immediate reinforcement that often comes from going to work and having an income. It may be part-time work, but they have something coming in, and it gives them a sense of personal worth, an identity. All of these ingredients in the vocational process we would like to see replicated in the broader arena of education. It is here that I agree wholeheartedly with Dr. Mangum that much of what has been used in vocational education is emanative--perhaps vocational educators have not identified it as such, but nevertheless it is there, and it is what makes the difference.

Mr. Colburn:

I am from the Office of the Secretary of Defense. Many of the issues that have been raised here are of major concern to us. Mr. McNamara has a great concern for the individual as a member of society, and at the present time, we are investigating how best to act in preparing the youngsters who are coming out of the service for getting jobs. There is one thing that Dr. Venn said this morning that struck a responsive note. This is the matter of the nonacademic portion of adjusting the individual to his vocation.

I think much of the discussion here has been in terms of what can the schools do, whether they be vocational, posthigh, or general schools. I think the question should not really be approached from that end at all at this juncture. The major problem that we face in society is not what percentage should be vocationally trained, but the problem of adjusting individuals to society, who, under the present situation, do not adjust. Such individuals are being kept in school because this keeps them off the streets or out of mischief. We have been concerned with the underprivileged. As I think many of you are aware, we are taking in people with standards that are lower than we had before. We know that these are the dropouts; these are the people who do not succeed for one reason or another. The thinking has to be directed in terms of a resolution of the problems for them. The problems for them, I think, are not in the academic context, whether it be vocational or nonvocational. The problems are in adjusting.

I would suggest one approach that I think makes sense and that is to give these individuals jobs, to subsidize their training on the job in sort of an apprentice system, and to assure that they stay on these jobs as they succeed.

This solves some of the problems that are raised here; that is, the problems of how do you train whom? You put the individual into a school system; the school system can be academic in the sense that we know it, possibly slightly oriented toward technology or toward vocation for those who want it, but the individual who cannot succeed in this system is taken care of outside the school system. He is put to work. He is given the few things in society that we can offer, which are economic and personal status. I think if we start from that end, we will take care of a good deal of the problem here. This does not mean the abolition of vocational training; the abolition of the posthigh school, two-year curriculum; or any de-emphasis of the academic. It means giving the individual the choice and the background to go to that kind of work, to that kind of training that he feels most useful for him.

Dr. Arnold:

As a point of information on this matter of content and method, I wonder if I could point out something to you that I think most of you would not be familiar with. I am not sure what the situation was when Dr. Mangum took his vocational training, but when I, and many others, took vocational education in the public schools we were in an 8-4 system, not in a 6-3-3-system. In the program I was in, and in many that I supervised, there were, over a four-year period, 4,800 hours of instruction, 1,200 hours a year, half of which went into the shop and laboratory training. The other half was devoted to academic and related subjects. When I came out of that program, I had 2,400 hours of shop instruction and a whole range of English, math, science, and social studies. I was rated as a beginning fourth year apprentice, in a formal system, and given a fourth year apprentice rate. In 2,250 hours I got a journeyman's rate. Now the point I wanted to make is not the personal illustration, but the move into the 6-3-3 system. Then came the emphasis: "Don't press young people to make choices, give them time." When I came back into the vocational education system in 1950, I found one-year programs of not even 1,200 hours but 540 hours of instruction for entrance into a highly skilled trade. The difference was that the employer saw practically no value in the reduced training program, and so the content became less important. I think that de-emphasis has been going on in the public secondary school system by and large, and I think that is what would make Dr. Mangum's point a valid one--that the method of instruction for average or less than average students must be given more attention--the individualized instruction, the intensive job analysis, the identification of specific units of instruction, and recognition of very fundamental principles of learning to be applied. I think Dr. Mangum is making a good point. It is certainly worthy of considerable study. There are a lot of people in vocational education still arguing for the old, intensive, complete program I went to school for six and one-half hours a day to get. They do not schedule classes six and one-half hours a day any more. There is a very interesting problem here and I think it could very well be addressed with profit.

Dr. Hall:

In Dade County, Florida, we schedule ours seven and one-half hours a day. I just wanted you to know that.

Mr. Kotz:

Thank you, Dr. Mangum, for a most lively and stimulating presentation. It gives us a preview of some of the thoughts you may be feeding into the advisory committee. You have sparked a lot of discussion here, some agreements, and some controversy and perhaps you would like to respond.

Dr. Mangum:

When he first got here, Dr. Arnold stated my points better than I stated them myself. In fact, I did not realize how clear they were until I heard him stating them, and that is simply this: His concern, the concern of vocational educators, is how to do a quality job of what they are already doing. My questions were, of course, directed more to the point of: "Is what is being done the right thing?" It seems to me that the vocational educator is doing the appropriate thing for him to do. His job is to pursue what he was paid to do. If society decides it wants to pay him to do something else, then it can. I think that the value of the MDTA in those kinds of things is not that it is a model but that we have demonstrated that if we pay the vocational educator to do something else, he does *that*. I think he does a pretty good job of it. But the *real* question we have to ask in terms of all the alternatives again is: "Is what we pay those people to do, recognizing that they are doing a good job, what we *really* want them to do?"

Chapter 6

PROBLEMS OF APPLICATION OF THE PPB SYSTEM TO EDUCATION

by

Charles J. Hitch

Background

The PPB system--a management system--is designed to inject needed efficiency into the decision-making process in any large organization. Its purpose is to make better, not easier, decisions. I know of no device for making decisions easy.

The PPB system has definite applicability to vocational-technical education. The objectives of such education can be defined more easily than, for example, those of liberal arts, since the demands of the labor market can be, and have been, analyzed. One can determine the quantities of persons with certain kinds and degrees of skill that are required. In this respect, it is akin to medical education, where we have made studies of this kind.

The need for skilled health professionals, particularly medical doctors, will become increasingly critical in the next few decades. The doctor, the most skilled member of the health team, is in shortest supply, both currently and projected. Moreover, his education is very expensive and has a long lead time. These constraints sharply impinge on our ability to produce significantly more doctors in the short range. However, we can increase the supply of the other health professionals--nurses, anesthetists, technicians--who can take over some of the functions now performed by doctors. If we can identify the optimal mix of health professionals, we can increase the productivity of doctors without increasing their number. Other vocations are subject to similar analysis.

Nineteen months ago, President Johnson directed all federal government departments to introduce program budgeting systems similar to that of the Department of Defense. It is my impression that most of these departments are still struggling manfully to learn just what this means and how to comply. What is program budgeting or the PPB system? In my lexicon, it is a combination of two management techniques which are related and mutually supporting but distinct; in fact they are so distinct that it is possible to use either without the other. One of these management techniques is called program budgeting or, more simply, as in the Department of Defense, programming. Since program budgeting is also used more broadly to mean the whole PPB system, I will use the simpler term programming to describe this part of the system. Programming as an activity produces a program which has the following characteristics: First, it is organized by programs rather than by objects of expenditure as traditional budgets are. Or, if you prefer, it is classified by outputs which are objective-oriented rather than by inputs. The resource requirements and the financial or budget implications are linked to these program outputs. Now, I know to many people this is just about all that the term program budgeting conveys. In my opinion, this by itself is not a very significant change in traditional budget procedures. But there is a second characteristic of programming; namely, that the program extends far enough into the future to show to the extent practical and necessary the full resource requirements and financial implications of the programmed outputs. In the Department of Defense, the programmed outputs are usually shown for eight years and financial implications for five years.

The second of the two management techniques in the PPB system is named systems analysis. It is sometimes called effectiveness/cost analysis, or benefit/cost analysis, as well as by various other names, including operations research or operational research. The whole system seems to be singularly plagued by terminological confusion. Let me call the second technique systems analysis, as that is its official name in the Department of Defense. Systems analysis in the PPB system is explicit, quantitative analysis, which is designed to maximize or at least increase the value of the objectives achieved by an organization, minus the value of the resources it uses.*

These two techniques, programming and systems analysis, were introduced into the Department of Defense by Secretary McNamara for one purpose: to improve the high-level planning of the Department; that is, planning at the level of the DOD headquarters, service headquarters, and headquarters of the unified commands. Other management functions in the Department of Defense, such as control and operations, were not affected, except indirectly, by these particular McNamara innovations. Even the format of the annual operating budget as appropriated by Congress and accounted for by the Department's accounting staff was unaffected, at least initially. Instead, we developed a torque converter for translating the five-year program into the budget format and vice versa. I emphasize the exclusive relation of these techniques to the planning function for clarity in explaining their rationale, certainly not to disparage them, for I consider planning and its various aspects to be the important function of top management in any large organization, whether government, business, or education.

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* Editor's note: A broader definition by Edward S. Quade, widely accepted, differs from this, stating:

> "In light of its origins and its present uses, systems analysis might be defined as inquiry to aid a decisionmaker choose a course of action by systematically investigating his proper objectives, comparing quantitatively where possible the costs, effectiveness, and risks associated with the alternative policies or strategies for achieving them, and formulating additional alternatives if those examined are found wanting. Systems analysis represents an approach to, or way of looking at, complex problems of choice under uncertainty, such as those associated with national security. In such problems, objectives are usually multiple, and possibly conflicting, and analysis designed to assist the decisionmaker must necessarily involve a large element of judgment."

Planning

The planning function is concerned with time, substance, and money. With regard to time, planning usually is broken down into three periods. There is short range planning--planning for the use of existing facilities and resources; is intermediate range planning--planning for procurement and construction of new facilities; and long range planning--planning of new developments with very long lead times, such as new major weapon systems in the Department of Defense or new campuses for the University of California. In Defense, we generally found a ten year planning cycle long enough for most of our developments. In the University of California, the lead times are longer. New campuses require that we look about 35 years ahead to the year 2000, and we attempt to do so.

Another distinction which is critical to my discussion is that between substantive planning and fiscal planning. Fiscal planning is the planning of future budgets: how much money and how to spend it. Substantive planning is the planning of objectives--ultimate objectives and intermediate objectives. In the Department of Defense, substantive planning is called military planning. In education, it is called academic planning. Both fiscal and substantive planning can be short, intermediate, or long range.

I repeat, the reason that we introduced the two techniques of programming and systems analysis in the Department of Defense in 1961 was to improve the exercise of the planning function, which we found in disarray. We introduced programming to make the military planning of the Department more realistic, to make it face up to the hard choices by linking it to the fiscal planning, from which it had been divorced. And we introduced systems analysis to provide a criterion or standard for making the hard choices to achieve some rationality and optimality in the planning.

When I say that planning was in disarray at the beginning of 1961, I mean just that. There was plenty of planning activity of all sorts in the Department, short, intermediate, and long range; military; and fiscal. The key to the disarray was the almost complete separation of substantive or military planning and fiscal planning. These two types of planning, in the first place, were performed by two different groups, the military planning by the Joint Chiefs of Staff and the military planners in the services and the fiscal planning by the civilian Secretary and the comptroller organization throughout the Department. Second, the two types of planning were couched in different terms, not readily translatable, and, in general, not translated. Military planning was in terms of Army divisions, Navy ships, fighter aircraft squadrons, and so forth--military units or weapon systems, the outputs of the Department. Fiscal planning was in terms of budget categories, which were military personnel, operations and maintenance, procurement, research and development, military construction--input categories. In practice, the long and intermediate range military plans of the Joint Chiefs of Staff and the services were either not costed out in terms of their budget requirements, or this was done so roughly and unreliably as to be unusable. Third, the two types of planning were for different time periods. There were intermediate and long range military plans, but no fiscal plans extending beyond the next budget year.

In consequence, the intermediate and long range military planning was largely ineffective. The Department of Defense, one of the world's largest organizations by any standards, had no approved plans extending more than one year into the future. Each year the Joint Chiefs of Staff would produce its massive intermediate-range military plan called the Joint Strategic Objectives Plan, the JSOP, with force tabs extending five to ten years into the future and would send it to the Secretary of Defense, who would note it and file it. Before McNamara, no JSOP was ever approved. Then in the budget season, in October and November, the real-life decisions were made by the civilian secretaries, advised in the main by the comptroller organization. Why was the JSOP ignored? Primarily because it was financially infeasible. It was more or less a pasting together of the wish-lists of the four military services. If costed out, the budgets it required would be far in excess of what any Secretary of Defense, or President, or Congress, would approve. The system, in short, did not require the military planners to face up to the hard choices that are part of responsible management. Let me emphasize that this was not the fault of the military planners, but a fault of the system. In organizations with similar systems, academic planners and business planners act just like the military planners.

But since the military planners did not make the hard choices, the civilian Secretary had to as best he could in his budget review and without much help from intermediate or long range military plans. The method which he used in his budget review, lacking any other, might be described generically as the budget-ceiling approach. The President would indicate the general level of Defense budget he felt was appropriate to the international situation and to his overall economic and fiscal policies. The Secretary of Defense, by one means or another, would allocate this figure among the three military departments. Each military department would in turn prepare its basic budget submittal allocating its ceiling among its own functions, units, and activities.

It was recognized long ago that this was a rather inefficient way to go about preparing the Defense budget. For one thing, the budget submittal did not provide the right kind of information for programmed decisions. It was not organized by programs and it extended only one year into the future. Secondly, the decisions were too decentralized to achieve a balanced overall program. Each service naturally tended to exercise its own priorities favoring its own unique missions to the detriment of joint missions, striving to lay the framework for an increased share of the budget in future years by concentrating on alluring new weapon systems and protecting the overall size of its force structure. Moreover, because attention was focused only on the next fiscal year, the services had every incentive to propose large numbers of new starts, the full cost-dimensions of which would only become apparent in subsequent years. This is the foot-in-the-door or thin-edge-of-the-wedge technique which one-year-at-a-time approaches to budgeting greatly encourage. So, every year the programs of each of the services had to be cut back to fit the budget ceiling by program cancellations, stretchouts, or postponements, but only for that year. Beyond the budget year, unrealistic plans continued to burgeon. Perhaps next year the budget would be higher.

We introduced the Five Year Force Structure and Financial Program to correct the basic flaw in the system, namely, the separation of planning and budgeting. You will recall that the program is organized by outputs, like the military plans, which can be related to national military and foreign policy objectives far more readily than the traditional budget categories. The basic elements of the program are force units, such as Army infantry divisions; weapon systems, such as Minuteman missiles; or development projects, such as the Nike-X antimissile missile. The sum total of the program elements, of which there are about 1,000 when one includes the overhead elements, is the total program of the Department. You will also recall that each program element has with it its full resource and financial costs year by year, five years into the future, for all the men, equipment, supplies, and installations required to make it effective. The total dollars required for the program each year are within limits which the Secretary of Defense considers appropriate and feasible. The program shifts the emphasis from cost in next year's budget to cost to complete and operate a weapon systems program.

The program, once established in 1961, is continuously in being. There is always an approved program of the Department extending four to eight years into the future. However, a program change procedure may result in several billion dollars' worth of changes in the program each year. Any office of the Department of Defense may propose a change in the program at any time. All major changes have to be approved by the Secretary after review and recommendations by the Joint Chiefs. So we end up with a flexible PPB system with the program linking the military plans on the one side and the budget on the other.

The function of the planning in the PPB system is to develop better alternatives than those which are in the current, approved program. The planning is carried out at all levels of the Department and takes three forms. One of these is the more or less traditional military planning such as that which was embodied in the JSOP, which continues. The second is systems analysis. The third consists of blends of the two. The budget in the system has become, in effect, the first annual slice of the five-year program. The annual budget review continues, but it has become an intensive final analysis of the financial requirements of the program for the next fiscal year rather than a review of the program itself.

Systems Analysis

The second of the management techniques which constitute the PPB system is called systems analysis effectiveness/cost or benefit/cost analysis or operations research. Systems analysis, in the sense in which I am using the term, has nothing in particular to do with computers. You can do it with or without computers. You can do good ones without or you can do bad ones with, or vice versa. Systems analysis in the sense of effectiveness/cost analysis is nothing more nor less than economic analysis applied to the public sector of the economy or, indeed, to the private sector. Economic analysis is concerned with the allocation of resources. Its basic tenet is to maximize the value of the objectives achieved, minus the value of the resources used. In business, this reduces itself to maximizing profits, both income and outgo being measured in dollars. In Defense and generally in the public sector, we lack a common valuation for objectives and resources. Therefore, we have to use one of two weaker maxims: maximize objectives for given resources, or minimize resources for given objectives. A systems analysis attempts to assist the decision-maker in Defense to choose weapon systems and modes of operating them which maximize some military objective or objectives (for example, the number of attacking bombers or missiles shot down) for given resources (for example, budget dollars available). The function of the program is to cost out the plans to keep them feasible and realistic to make the planners face up to the hard choices. The function of systems analysis is to get dollars into the calculations at an earlier stage, into the planning process, and into the evaluation of alternative ways of achieving a military objective. You cannot choose the optimal way or even a good way without knowing about the alternatives, what the alternatives might achieve, and what they would cost.

From small beginnings which long antedated McNamara, in fact, they date back at least to World War II, the use of systems analysis has been rapidly expanded since 1961 until it has become a vital part of the planning and decision-making process in the Department of Defense. Since September 1965, it has become the sole function of an Assistant Secretary of Defense.

Let me emphasize that systems analysis plays only a supporting role in optimizing decisions, even in the Department of Defense. It assists the decision-maker by furnishing him relevant facts with which he can inform and sharpen his intuition and judgment; it does not itself make the decision in any area. Moreover, certain areas of Defense, such as anti-guerrila warfare, have not proved susceptible to such analysis at all.

So, in summary, the program provides the link between planning and budgeting, relating forces and their costs to national security objectives, while systems analysis provides the quantitative analytical foundation in many areas for making sound choices among alternative means of achieving the objectives. Between them, they give the Secretary of Defense the tools which are necessary for planning a program with balance and some rationale and, therefore, for the unified management of his $70 billion a year department. For the first time, the Secretary of Defense is capable of exercising the authority given him in the National Security Act of 1947, which attempted to unify the military services.

All large organizations, whether government, business, education, or mixed, have many problems in common. I am very impressed by the similarities, having recently moved from one large organization to another which might appear to be very different, but which has many of the same problems. Among these is the problem of achieving realistic, balanced plans. I found academic planning in the University of California in exactly the same kind of disarray as military planning was in the Department of Defense and for essentially the same reason. So I am sure that similar techniques do have applications in other organizations.

Application of Techniques

The techniques used in the Department of Defense already have widespread application. The Department is not the first organization to develop a financial plan or program which extends more than one year into the future and which has evolved budget categories more suitable for intermediate and long range planning than objects of expenditure. Other organizations have confronted, and more or less satisfactorily solved, the problems of unrealistic and too decentralized planning. Similarly, many well-managed businesses make explicit quantitative economic analyses, such as alternative equipment and facility plans, which are indistinguishable from what is called systems analysis in the Department of Defense. Operations researchers have assisted military, other governmental, and business planners with varying degrees of success for the past 25 years. What is different in the Department of Defense is that systems analysis has there become a generally acceptable way of life, perhaps for the first time in any large public organization. There are risks and dangers as well as opportunities in trying to move too far too fast in the application of new management techniques, including the risk of discrediting them. Although it did not appear easy at the time, there is no doubt in my mind that the Department of Defense, or much of it, is easier to program and to analyze quantitatively than many areas of civilian government. For example, it is certainly easier than the foreign affairs area where I have, perhaps foolhardily, and certainly without much success so far, been attempting to advise the Department of State on how to install a PPB system. Quite apart from these difficulties, the substantive problems in other areas are different and new. In Defense, we had several hundred analysts at The Rand Corporation and elsewhere developing programs and systems analysis techniques for a decade before the Department attempted any large scale general application. No remotely similar preparatory effort has gone into any other governmental area, or into education, and the number of trained, skilled people is so limited that they are inevitably spread far thinner in non-Defense areas than they were and are in the Department of Defense.

Although these techniques are mutually supporting, we are not dealing here with the question of either/or. There is an infinity of degrees. Not only may one introduce a program budget without systems analysis, or vice versa, but also each may be used in limited areas or ways and sometimes quite productively. For example, in foreign affairs, where quantification of objectives and therefore full systems analysis is so difficult, one can, I think, organize the budget more meaningfully for planning purposes. In many areas, a systems cost analysis is possible and useful, although a full systems analysis, including measurement of objectives, is not as yet.

Can the system developed in the Pentagon be usefully applied in education? If so, how? In developing program budgeting for educational institutions, we first have to face the basic conceptual problem: What is the appropriate program structure or what are the objectives of the institution? A program structure can be broken down into ultimate objectives and tangible intermediate objectives. Intermediate objectives relate to the ultimate objectives and can be programmed or projected and costed out. These are the program elements, the basic building blocks of the program budget in terms of which substantive and fiscal planning are accomplished.

In Defense, too, our first job was to develop the program structure. The ultimate objectives of national security are to deter wars, or, if deterrence fails, to fight effectively. However, these are too amorphous to use directly as program elements.

In selecting intermediate objectives for use as program elements, we found a significant difference between the Air Force and the Navy on one hand, and most of the Army and Marines on the other. In the Air Force and the Navy, weapon systems are the natural program elements. In the Air Force, these are aircraft and missiles; in the Navy, ships, aircraft, and missiles. In contrast, people are the basic program elements in the Army. Technically, the Army program elements are divisions, brigades, and battalions, but these are only proxies for people.

A division means 15,000 troops in a mix of combat and combat/support units. When Army or Marine strength is planned in terms of the requirements in Europe, Southeast Asia, or the reserve, the natural units seem to be numbers of personnel.

I suggest that, for program budgeting purposes, the elements of educational institution, like those of the Army, are people. The ultimate objectives of university level education--research, instruction, and public service--are too amorphous and overlapping to serve as program elements. The objectives of vocational and technical education, although they lend themselves more easily to programming, are also too widely construed to serve as basic elements. On the other hand, those that contribute to the ultimate objectives of education--the faculty and students--decidedly are not amorphous; they can be programmed.

The basic projections which we make for our program at the University of California are students by numbers, level, and discipline and faculty by numbers, rank, and discipline. Almost all other expenditure programs are tied directly or indirectly to one or both of these projections. Most kinds of capital outlay are related by space and utilization standards to students or faculty or both. Library acquisition objectives are related to both students and faculty. Faculty support is tied directly to basic faculty projections. The maintenance and operation of plant is tied to plant projections, which have in turn been related to both students and faculty. A complicating factor is that although faculty and student projections are expressed in numbers, quality must be at least an implicit dimension in both cases.

The University's program elements derive from the basic projections of faculty and students--they are campuses, their component schools and colleges, and departments--aggregations of faculty and students. The major management decisions relate to programs in this sense, not to such objects of expenditure as electricity, buildings, or pencils. There is always an arbitrary element in the definition of a program structure, and the structure should be changed if and when the character of the major decisions changes. In fact, programs can be defined as what management should be making its major decisions about.

Systems analysis has three major characteristics. First, it is quantitative to the greatest possible extent. Even where benefits cannot be measured in terms of money, they frequently can be measured in other quantitative terms. Second, the analysis is tied to the goals and objectives of the organization. In this regard, it is critical that these goals and objectives be clearly defined so that the best means of measuring them can be developed. Third, the analysis evaluates alternatives in terms of the costs and benefits of the whole system or program.

Let me use two examples to illustrate this last important point. We were faced with rapidly rising costs at the University of California primarily as a result of the pressure of an increasingly large freshman population. Further University expansion seemed necessary, but costs were an obstacle. One alternative was conversion to year-round operations using the quarter system; the University was on a two-semester schedule which totaled only 36 weeks. To make this comparison, it is necessary to include all costs--both capital and operating--for both kinds of operation. The objective of year-round operations is to save capital outlay costs without an equivalent, offsetting increase in operating costs. The most convenient mode of analysis is to compare equal benefit cases, that is, those where the throughput of students over a period of years is equal in both systems. We made such an analysis and found that indeed there are substantial savings in capital outlay and essentially no net increase in operating costs for equal student throughput with the quarter system. The University is now converting to the quarter system and initiating year-round operations.

Another analysis we have made attempted to define optimal standards for space utilization. There has been a tendency to assume that the higher the degree of utilization of space on a campus, the better. However, this widely held assumption does not take into account the fact that high space utilization requires using classrooms at less convenient times. This leads to smaller average class sizes and lower student-faculty ratios, which increase operating costs. Since operating costs are typically so large in relation to capital outlay costs, a rather small increment in average class size may more than offset the savings occasioned by higher space utilization.

Summary

The program budget is a multiyear document which lists the programs of an organization and identifies and assigns all costs associated with each program. The program budget enables the decision-maker to see the future implications of today's choices and to evaluate the organization's progress toward its own stated objectives.

The program budget is formally linked to substantive planning. This tie ensures that budgets will be derived from the purposes and objectives of the organization and not vice versa.

I hope I have demonstrated that the PPB system should not be confined to the Department of Defense. I believe it to be a system which is potentially useful in any organization with problems of planning, budgeting, and control, and it is my experience that all large organizations have similar management problems.

I am convinced that there are many institutions which are particularly ripe for the application of some efficiency in using management techniques and for basically the same reason that the military was ripe. Hospitals, for example, have, like the Army and Navy, traditionally and proudly operated on a not-for-profit basis. Just as the generals and admirals asked "What do dollars matter when national security is at stake?," doctors and hospital administrators ask "What do dollars matter when life is at stake?," and I have heard educators ask "What do dollars matter when the quality of the next generation is at stake?" Well, the dollars do matter, because no institution has access to unlimited resources. Granted that these are all high-priority claimants on the national purse and that there is a kernel of truth in each protesting cry, the importance of objectives does not justify ignoring the canons of economy and efficiency, which are to achieve the most from whatever limited resources the nation places at our disposal.

PART III: ALTERNATIVE PROGRAMS

Chapter 7

INTRODUCTION

Part III concerns alternative programs to achieve the objectives of technical education. Chapter 7 sets forth the reconnaissance survey findings identifying many alternative ways of achieving the objectives. When there are many job vacancies, for example, for technical occupations, all of the pipelines of supply such as training in public institutions, proprietary schools, or industry may usefully contribute to meeting the demand. However, demand may be more critical for both the individual and society in some occupational areas than in others. Further, training in some categories such as home economics and agriculture may not only contribute more trained persons than there are jobs to accommodate them, but also may train individuals in behavioral outcomes that are not directly work-oriented. The survey findings indicate that the alternitive programs to achieve objectives are not subject to critical comparative review nor are priorities normally set for them in relation to their importance to achieve their objectives. Both Part III and Part IV,* which is concerned with program structure and budgeting, indicate that there is a serious need for systems analysis of alternative ways to achieve the objectives and goals, for the choice of optimum programs, and for establishment of priorities among them.

Chapter 8 on An Educational System for the Seventies by David Bushnell and Robert Morgan of the USOE, discusses at length the systems approach in relation to "a need for a major redefinition of goals and an overhaul of the educational process." They propose major curriculum redesign and the transfer of technology aimed at the need for broader-based education that would defer occupational choice to postsecondary time frames. They express the conviction that the separation of general and vocational education penalizes both the students who are college bound and those who plan to terminate their formal education at the end of high school or junior college. They outline the requirements for a systems design of a truly integrated curriculum that leads to the efficient attainment of desired behavorial outcomes. They claim that the resources are available to permit the schools to implement the concept of an excellent educational experience that can become a reality for the nation's youth.

Wilbur E. Landis, in Chapter 9 presents interesting perspectives on the Chrysler approach to occupational training. He describes how the company works with the public agencies in recruitment and training of workers. The frequent use of manpower training programs is particularly noteworthy. He also stresses the fact that persons are trained in their program on company equipment and in specific working procedures of the company and are assured of placement on successful completion of the training program. The discussion brought out clearly the preference of the Chrysler Corporation for employees who at least have high school education as a base for technical training and the more difficult jobs below the professional level. Landis did indicate, however, that once a person starts the job, further upgrading depends on performance as well as training. It is also interesting to note that for some of the general skills for entry level jobs Chrysler tests achievement at the level of fifth to sixth grade arithmetic. For some employees, therefore, Chrysler Corporation is only interested in lower level skills and it will undertake further training of the employees thereafter.

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* Part IV is in Volume Two.

Dr. Lawrence Thomas' reaction to the Landis presentation was most interesting. He suggested that some high schools--by emphasizing only the intellectual process and not the doing--make learning tedious rather than stimulating. He suggested that this is "the kind of education that reminds him of cut flowers. You cut them from the roots and carry around the cut intellectual blossoms and watch them wither and fade." Although he stresses the importance of both the intellectual process and the doing, he questions whether the Chrysler employees are learning only the doing and not the intellectual processes. He suggests that it would probably be a better expenditure of Chrysler funds if the company encouraged employees to finish high school rather than engage in some other form of employee development.

Robert Worthington has the responsibility for both vocational education and manpower tr-ining programs in New Jersey. He describes the objectives of occupational education and training and some of the alternative programs conducted to achieve it, as well as efforts for master planning that he has started. He then sets forth some of the assistance that he feels New Jersey can use from the research community and the federal government, with particular respect to the systems approach in analytical studies in education.

Discussions that follow by Joseph Tuma and others center around other major problems. One of these concerns the myth that asserts that 50 percent of the jobs will change in nature in a short time period due to rapid advances in technology. There was general agreement that it was a real disservice to youth to disseminate such misinformation through communication media.

Current Programs to Achieve the Objectives

One of the most critical and, at the same time, most creative parts of the planning process is the need to search out alternative courses of action or strategies to achieve the objectives and goals. It is at this point that the application of analytical techniques is carried out through broad systems analysis in which alternatives may be compared for both their benefits and their costs.

The planning and programming of vocational education in the states and communities surveyed reflect some recognition of the divergent concepts and philosophies that are directly relevant to their activities. However, no clearcut identification or display of alternative strategies was found at any governmental level. There was no attempt at systematic analysis of the alternative courses of action as a basis to facilitate decisions reflecting efficient allocation of resources.

The research identified several major strategies that are sharply divergent.

When one groups the objectives as shown on Table II-1, it becomes clear that there may be conflicts among them. For example, if one pursues the economic efficiency objective, one might want to select the brightest pupils with the highest number of students per teacher in order to get them through the training program at the lowest cost. The brightest students would most likely be placed in the highest paying occupations with the prospect of a favorable benefit cost ratio being the outcome, so that the economic efficiency objective for this group of students would be achieved.

In addition to economic efficiency, society looks to the educational institutions to contribute solutions to many of our social ills. Therefore, the redistribution of income becomes an important objective of the school system, as well as the noneconomic welfare objectives of nondiscrimination. If the decision is made to undertake a program of training the disadvantaged, a lower number of students per teacher may be used, remedial training programs as well as special equipment, health programs, and counseling services may be required, all of which add to the costs. As an outcome of the training, many of the disadvantaged persons will enter entry-level jobs without too much hope of rapid advancement in their careers. In this situation, costs will be greater and benefits will be smaller than in terms of the economic efficiency example just cited. In such situations, the use of economic efficiency criteria alone would be inappropriate. It is obvious that the equity objective and the economic objective may conflict, and, through the planning process, ways should be sought to harmonize programs designed to achieve multiple objectives.

An additional illustration may be cited. It costs the same to train female workers in a given occupation as it does males. Yet the female may be withdrawn from the labor market for half her potential working life, thus reducing the income stream and the resulting benefits. Because of equal rights for women, we appropriately undertake their training along with that of men even though the benefit/cost ratios are disparate. It is quite obvious that the economic analysis resulting in the efficiency criterion must be used with caution in making judgments about programs that are pursued to achieve the multiple objectives of the educational process.

The construction of a substantial number of separate secondary area vocational schools could result in large costs to the nation in terms of funds, facilities, and resources that might be consumed in carrying out this strategy; these facilities and resources could conceivably be abandoned by later adoption of an alternative plan four or five years in the future to use comprehensive high schools rather than segregated vocational secondary schools.

Other alternative programs are outlined below.

Manpower Training

The systems approach to planning requires that alternatives to achieve objectives be structured from a broad societal viewpoint. This means that we are not merely concerned with the vocational education that is performed in public school systems. In the federal government, manpower programs under the MDTA come under the Labor Department and vocational education comes under HEW. In conducting programs to reduce unemployment and social tensions in the ghetto areas of city centers and to increase the earning stream of disadvantaged persons, manpower training programs and vocational education share goals and have programs of action to attain them. Frequently, the manpower programs will use vocational educators to conduct the training programs. The effectiveness and costs of these programs should be compared and information displayed to decision-makers so that the best courses of action may be decided on by the educational managers. The chosen strategies may include a mix from both of these funding sources, depending on the nature of job openings, the abilities and motivation of the trainees, the sensitivity of the social situation, and other relevant factors.

Broader Based Training

The concept of broader based training assumes that changes in the world of work due to rapidly developing technology and innovation may require several changes in jobs and required skills by an individual during his work life. Therefore, the greatest service that the educational system can provide to the individual and to the nation would be to offer to all students broadly based training in regular secondary subjects that are found to contribute most to effective performance in a wide variety of occupational families. Courses in English, mathematics, and the like would be in this category. The secondary high schools would be comprehensive in nature and provide some exposure to the world of work. However, early commitment to fitting an individual to a particular occupation would be avoided until the postsecondary time period for each student wherever feasible.

This broader based training would prepare the individual for a cluster of jobs or for several job families. The training would be pursued on the basis of careful identification of worker characteristics, traits, skills, and knowledge essential for competent and effective performance. Under this concept, one would defer occupational choice to the point that would optimize the net benefit that would accrue to the individual or the group. For some, this could mean education through postgraduate school. For most, the aim would be to undertake general training at least through secondary school before narrowing options by commitment to specific occupational training at some year of their high school career. For others, vocational courses in the comprehensive schools would concentrate on fitting them for specific job opportunities.

This concept was expressed by John W. Gardner as follows:

> In dealing with children of differing potentialities, we must remember that all are worthy of respect as human beings, all must know how to live and work together. They should never be handled in such a way that some youngsters appear to belong to an elite group while others are classified at a lower level. The comprehensive high school works to this end by keeping all students, whatever their ability, in the same educational community: students of every level of ability sit in the same homeroom, play on the same teams, act in the same plays, and have many other activities in common. It is essential that the tradition of the comprehensive high school be preserved and strengthened. . . . The student not going beyond high school should also have academic subjects at the heart of his program. But he can profit greatly, too, by good vocational courses. It is not wise to segregate vocational students into separate high schools, nor even into separate homerooms. Where such separation has acquired historic status, it will not be feasible to alter it, but the practice should be avoided where possible.[14]

The argument for integration of occupational education as an essential part of the total education system was advanced by Grant Venn as follows:

> The educational preparation of every youth must provide experience and learning that will enable him to move into his next role in life, whether this be further study, either academic or occupational, or direct entry into the work world. The educational system must assume responsibility for every individual's preparation to move on to a next step.

> No person can be successful in occupational education unless he has the basic tool skills of reading, writing, listening, and computing. This separation of occupational education from general education at any level increases the possibility of limiting the individual's future development because of lack of related knowledge and general education.
>
> Single purpose or special institutions, including the rapidly expanding area vocational schools and the two-year colleges offering only transfer courses, should become comprehensive in nature.
>
> The need for continuing education requires that comprehensive institutions provide courses of vocational and technical education, as well as general and related education, for those who are employed full time.[28]

Secondary Vocational Schools

Another approach suggests that the large number of dropouts and the substantial number of high school students who do not go to college should be provided with additional opportunities in their secondary education that would fit them for the world of work. This approach implies that many such individuals can thus be retained in the school system who would otherwise be dropouts and possible burdens to society. In addition, some students would choose secondary vocational schools despite all persuasion to encourage them to defer choice to postsecondary school time frames. Their training, as in postsecondary schools, would provide them with competencies, skills, and knowledge required to perform in jobs.

The provision of a sufficient number of course offerings, equipment, and buildings in many comprehensive high schools could prove very expensive and infeasible. The secondary area-vocational schools afford a wide diversity of courses to meet objectives and goals, as well as economies in the use of faculty, buildings, and equipment. In addition, where vocational education is mixed with secondary education, the former may suffer. The preponderant portion of the budget for secondary schools would go toward the objectives of students seeking entrance to college and those seeking a general track diploma. The faculties of such high schools, because of parental, student, and management attitudes, concentrate on getting their students into the good colleges and tend to denigrate vocational education. Even within a comprehensive high school, it is likely that a stigma may attach to those who elect to follow the vocational courses.

On-The-Job Training

On-the-job training is now conducted by many companies such as Ford, Chrysler, United Aircraft, and General Dynamics Corporation. Some portion of this training is without participation of the public vocational educational system. Of course, the costs of training become in part a company cost passed on to the consumer through prices charged for the final product and, in part, a cost to the workers in the form of lower wages during the on-the-job training period.

The argument for this approach proceeds along the lines that the most up-to-date equipment may be expensive to procure if training were to be given in a public institution and that the facilities to house such equipment also could impose severe costs on public institutions. Such equipment could rapidly become obsolete because of changing technology. The equipment used in company training programs is already in place to carry on the company's business. In addition, on-the-job training offered by a company usually ensures high probability of employment by the trainee if he successfully completes the training program. Such placement is the desired outcome of practically all occupational training. Public institution training programs usually would not have as high a probability of placement as private company training programs. In addition, the company would be training its employees in work procedures specific to the use of its equipment and its general operations.

There are two major drawbacks to relying heavily on programs that offer on-the-job training. One, the training may concentrate on narrow occupational competence and ignore important additional objectives of education. Two, during a plateau or a contracting phase of the economic cycle there may be underinvestment by private companies in training activities. However, it is possible to consider strategies such as subsidies or direct purchase from a private company to continue these training programs under such situations. Work study programs and approval of the total training program by educators may also help ensure the proper breadth of the entire training program.

Only the bare outlines of these strategies are presented here. Many advantages and disadvantages attach to each of them. Operations research and systems analysis could construct models based on each assumption or on combinations of approaches using each of them in different proportions. Depending on the strategy followed, it should be clear that different assessments of capacity required to meet demand would be forthcoming. This could have serious implications for facilities planning and programming and other resource inputs over the next five to ten years.

Other Strategies

On completion of their tours of duty, servicemen are released from the Armed Forces as workers trained in almost every conceivable occupation in the civilian economy, from bakers to electronics technicians and pilots. The Department of Defense has recently dramatized the expansion of its training program to include basic literacy training for inductees or volunteers who do not meet minimum standards. A report of the President's Task Force on Manpower Conservation pointed out that about one-third of all young men of draft age would be disqualified for service.[24] Of this number, about one-third failed the mental tests. The report estimated that there would be approximately 600,000 rejectees per year for the rest of the decade and recommended expanded programs of training and retraining, among other steps, to correct this situation. Have the substantial burdens for occupational and basic literacy training been undertaken by the Department of Defense because other training and educational institutions neglected to perform this task? Should some of the manpower training requirements of the Department of Defense, now performed by it, be satisfied by public educational institutions?

Some sophisticated arguments affirm that national security is so important that the military must have all the resources necessary to perform the job under strict control of the chain of command. But the Department of Defense relies on the public institutions to provide various types of education and training to its personnel. Appropriately, one may question whether some of the training now undertaken by DOD could not be better performed by public institutions at less cost to the nation.

Different strategies also could be compared to determine the relative costs and benefits of using proprietary schools as opposed to public institutions for the conduct of training. In several states, cosmetology courses are given with graduates required to take examinations given by state licensing boards. The proprietary schools provide training that may cost the individual from $400 to as much as $1,000 in tuition. Public schools provide such training at no tuition cost to the student, although there is the cost to society. The relative placement of students, on examination in one state, showed that the public schools were doing at least as well as the private schools. Since in both jurisdictions, the graduates were very much in demand, there is no placement problem. With respect to other occupations such as typing, electronic data processing, stenography, automobile mechanics, and many others, both public institutions and private schools provide training. Appropriate issues raised here are whether the proprietary schools should be encouraged to do more or less as compared with the public institutions.

An obvious area for development of alternative strategies is the determination of the program emphasis and priorities among the occupational categories in relation to current and prospective job demand. Similar analysis is required for comparison of training among particular jobs or job families within an occupational category.

The comparison between need intensity and course offerings presented in Chapter 10 suggests that some of the urgent and critical needs of states and communities for technical and health occupations are not being met while substantial effort goes into training people for home economics and other areas where less urgent requirements are shown. The surveys found very little consideration in the planning process of the major occupational offering as agriculture, home economics, health occupations, and technical occupations as being in competition for limited resources. In most situations, individuals assigned to such major occupational areas would proceed with parallel efforts to develop their programs on state and community levels. There is no planning process with analytical techniques designed to determine the benefits and costs to assist choice of one course of action compared with another, to establish priorities among alternatives, or to evaluate what mix of the alternative occupations could be offered that would meet objectives and goals in an optimum manner.

An additional set of alternatives would be concerned with recent innovations in educational technology, the determination of their utility and effectiveness, and their acceptance and installation by school systems. Some of these newer techniques include programmed instruction whereby the student proceeds at his own pace using either computer-assisted training or a programmed text, closed circuit television, team teaching, audio-visual aids, and other techniques now under development. None of the exotic new hardware items and approaches should be accepted without vigorous demonstration of the advantages that would accrue to the students and learning process in achieving the objectives and goals. The adoption of the systems approach to planning would ensure the application of the appropriate analytical techniques in evaluating the merits of the new technology and in providing answers as to the suitability of the particular piece of equipment or of an entire package for acceptance and transfer into a viable school situation.

The Richmond Plan of technical training for high school students developed by the Cogswell Polytechnical College of San Francisco, California, represents a creative design to accelerate the learning process and improve the motivation for average students. It integrated, through team teaching, the subject matter being taught in mathematics, English, physics, chemistry, technical laboratory, and other courses so that the students could relate manipulative performance and skills in which they do well directly to the theoretical content of their other courses. This helps them see the relationship between theory and practice. The pretech students take these subjects as a group, mixing with the student body for the other courses required in the 11th and 12th grades (history, government, and physical education).

In an undated report to the Ford Foundation, the project staff stated:

> The instructional techniques employed are well known. In general, they are applications of established principles in learning theory. Paramount among these is the Pre-Tech requirement that instructional objectives be specific, be couched in terms of behavioral changes expected of the student, be distributed to the student before instruction begins, and form the basis for evaluation after instruction is completed.
>
> The program uses occupational interest (engineering technology) as a motivating force behind a sound educational program. But this orientation does not lead to an educational dead end. The program does not lose sight of the fact that acquiring the ability to learn throughout one's life is rapidly becoming the most valuable asset of any worker.

In particular, the program can in no way be considered a "watered down" curriculum. It is a program designed for a specific purpose. Its curriculum is solidly wedded to its goals. Having a semi-professional rather than a professional (university) orientation, the program naturally places less emphasis upon theoretical and highly abstract concepts. Nevertheless, the student's cognitive abilities are severaly taxed. High quality student performance, corresponding to this potential, is expected and required.

The goal of the program is to enhance the school success of the participating students and to prepare them for curricula of a technical nature in junior colleges, community colleges, or technical institutes. By stressing education over training, this goal can be achieved by the majority of students and still allow the exceptionally competent to complete the final two years of college study.

The outlining of these different concepts and the need for considering trade-offs among them is not intended to show preference for one course of action over another. The necessary information has neither been collected nor displayed to facilitate choice of a preferred strategy. This diagnostic summary is intended to suggest some major issues appropriate for consideration by the analytical capacities of planning staffs to assist educational managers in chosing a preferred course of action among alternatives.

Chapter 8

AN EDUCATIONAL SYSTEM FOR THE SEVENTIES

by

David S. Bushnell and Robert M. Morgan

In the early 1950s, American education experienced its first widespread public scrutiny. In reaction to the dramatic scientific achievements of the Soviet Union at that time, the American people wanted to know: "Why are we behind?" In our frustration and bewilderment at having been bested by our cold war antagonists, we turned critically to the principal shapers of our engineers, scientists, and mathematicians in our schools. This attention resulted in significant changes in the educational system. In the decade following Sputnik, whole subject matter areas were revised. We now have new mathematics, modern physics, and new reading programs. Programmed instruction, computer-assisted teaching, and instructional television are passing from the experimental to the operational phase. Among the more important consequences of this focused attention is the realization by the public that the schools can change.

For years, the United States has led the world in its commitment to the goal of equal educational opportunity for all citizens. Universal education for virtually all U.S. children between the ages of 6 and 13 has been achieved. At the high school level, the United States leads all other nations in the percentage of 17-year olds enrolled in full-time schooling. A recent UNESCO survey reported the United States with 81 percent, England with 56 percent, Belgium with 30 percent, and West Germany with 13 percent of this age group enrolled in full-time education. Almost 70 percent of the youngsters in the United States who start in school at age 6 actually graduate with high school diplomas.

Our leadership at the college level is indicated by the fact that only 4 percent of college-age youths in the European Common Market nations receive university degrees in contrast to 20 percent of their American counterparts. These seem to be heartening figures, especially when viewed in the light of today's employment statistics.

It is true that we are educating more of our young people than any other nation--but is that sufficient? Last year's class of college graduates represented only about 20 percent of those who first began school. Some 19 percent of this group left school before the 11th grade, and 30 percent did not finish high school. About 35 percent entered college but only 20 percent graduated with a bachelor's degree. Thus, eight of ten of these students were candidates for jobs requiring less than a college degree.

Only one of these eight received any kind of occupational training in the public schools. The remaining 70 percent have historically had a limited number of options open to them. They can take entry-level jobs that have little requirement for skills, but these jobs are becoming fewer. They can be employed and trained by private industry in on-the-job or vestibule training programs; however, rapid economic expansion and changes in technology have made it more difficult and expensive for industry to provide this kind of training. A relatively small number can engage in apprentice training, but, again, there are only a small number of such programs available. A number will enter posthigh school vocational or technical training in community colleges or private institutes.

While the federal legislation supporting occupational training has a long history (dating back to the Morrill Act of 1862), this support has not been large compared with total expenditures for education. For example, the 1966 federal authorization under the Vocational Education Act of 1963 was only $175 million compared with total expenditures of almost $40 billion for all education.

It seems clear that more federal funds are needed to assist the established public educational institutions to develop and make available relevant educational and training programs that are responsive to the [illegible]nt economy.

A soaring technology and a healthy modern economy largely depend on our ability to adapt to changes in productive capacity. Not only are engineers needed to design and install new and improved equipment, but also more trained technologists are required to plan and manage production, to maintain automated apparatus, to sell and service products, and to conduct research for newer and better products. A growing modern economy also requires more and more teachers, scientists, professional managers, advertising and sales people, computer programmers and technicians, and mechanics and maintenance workers of all kinds.

Young jobseekers, faced with a continuing shift from production-oriented occupations to service occupations, require a broad base of cognitive, communicative, and social skills. Many of the former types of entry-level occupations are now unavailable to youngsters entering the labor market. Further, while qualifying for an entry-level occupation is a necessity, a person's first job can no longer be viewed as a final career commitment but should be looked on as the first in a series of job changes leading, hopefully, to a stable and satisfying career.

Unfortunately, much of what is now taught in our public schools fails to recognize that technology is generating profound changes in the nature of work. The tendency in the past to separate general and vocational education has penalized both those who are college-bound and those who plan to terminate their formal education at the end of high school or junior college. The academically oriented students are directed to college preparatory programs that will enhance their chances for college admission. They have little opportunity to acquire a knowledge of the occupational world in which they will live and earn a living as adults. At the same time, vocational students receive too little opportunity to develop competence in the basic educational skills that they must have if they are to cope adequately with presentday society.

Those who plan to go on to college are not prepared to cope with the question, "What happens if I leave college before graduation?" On the other hand, those exposed to current vocational programs frequently find themselves being trained for a narrow range of job skills. Even if such students should qualify for their first job, they are still faced with the need to adapt to a changing labor market. A third and large segment of our public school population is not enrolled in either vocational preparatory or college oriented programs. These "general" students often receive a diluted program that in too many cases provides little academic or occupational preparation that is useful to them in the adult world.

From the perspective of providing for the optimum development of all students, the present allocation of resources and the types of curriculum available in the secondary schools are inadequate.

Need for Redesign

The problems and shortcomings associated with our presentday program of education indicate a need for a major redefinition of goals and an overhaul of the educational process. Fortunately, the technology that created many of these problems offers some hope for their solution. The computer, for example, can serve as an intermediary between employers and school counselors, making possible far better information systems for funneling industry's job needs to curriculum planners in the schools. Flexible scheduling through computers can make possible the development of learning experiences to meet the particular needs of individual students; and indications are that computer-mediated instructional techniques can succeed in permitting the student to involve himself at his own rate in the learning process. Even computer games have been successfully employed as a method of teaching teenagers to think through appropriate career choices.

The use of instructional television, single concept films, videotapes, teaching machines, and simulators should be commonplace resources in the classroom by 1975. Textbooks will appear that will gear the information to the background and reading level of the student. Experiments with tutorial programs employing older students and subprofessionals offer hope for giving more intensive attention to those children requiring it, while at the same time helping to offset the spiraling cost of education. Each of these examples illustrates that we are in the take-off stage and can, with appropriate planning and funding, achieve the outer reaches of educational excellence.

Under the stimulation of federal legislation, new opportunities for research on major curriculum redesign are now possible. These opportunities are occurring at a time when teachers, curriculum planners, and school administrators are under pressure to provide today's youngsters with the kind of education that is relevant to living in today's world. It would be a mistake, however, to let employers with their frequently narrow entry-level skill requirements or even parents with their sometimes unrealistic career expectations dictate the type of education that should be available in our schools. The educator and the employer must work together to determine the appropriate knowledge, skills, and attitudes that will qualify today's students for their roles as employed adults and citizens.

Unless we radically modify our present system, we will not succeed in designing an educational program that will be responsive to the present day needs of students. The desired program should permit the maximum development of the potential of each individual. If a youngster leaves school before graduation, he should leave with functional skills. The student who graduates from the program should possess the necessary qualifications for maximum flexibility in his posthigh school activities. He might enter a university or a community college and pursue an academic program. He might enter a community college or a technical school and receive posthigh school occupational training. He should also have entry-level occupational skills that permit him to go to work. He should have the additional option of continuing his education in an adult education program, if he chooses. The key point is that he should be able to decide which option to choose after high school graduation, not three or four years before.

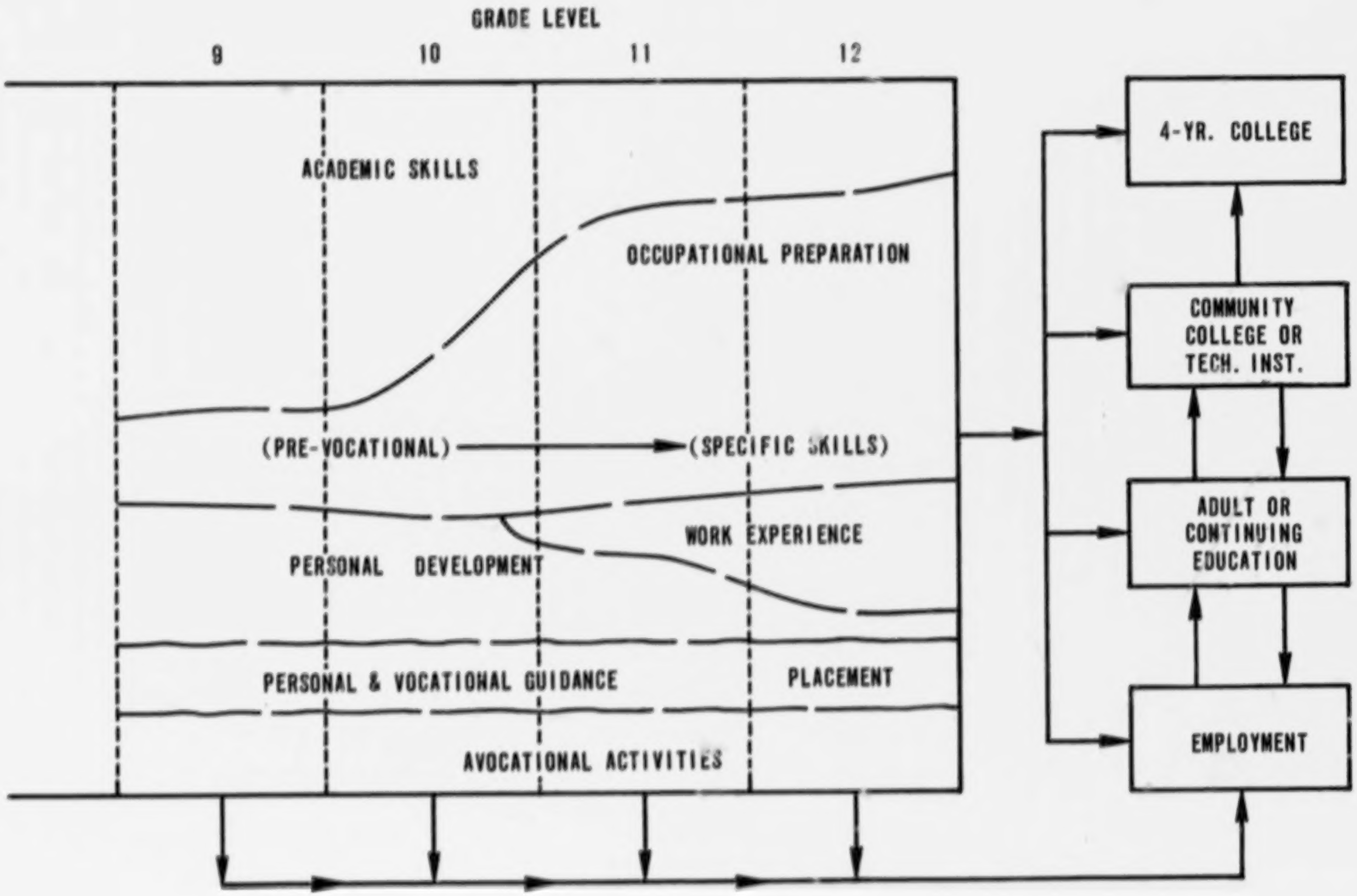
Design of an Educational System

The first step in building such a student-centered curriculum is to study those behavioral attainments needed by the individual for entry into a variety of posthigh school activities. Whenever possible, these requirements should be stated specifically and in measurable behavioral terms. Following the lead of the systems analyst, we should describe specifically and precisely as possible the learning experience that would lead to the desired behavioral outcomes.

The ingredients of a high school program that will assure the attainment of these specifications will certainly include academic as well as occupational training, but may also include such components as personal development, real work experience, and personal vocational counseling (see Figure III-1). Even the avocational or school-sponsored recreation or social programs may be considered an integral component in this system. Each of these components and subparts must be defined in terms of its contribution to the attainment of the specified behavioral objectives.

FIGURE III-1

COMPONENTS OF A HIGH SCHOOL PROGRAM TO ACHIEVE ENTRY TO POSTHIGH SCHOOL ACTIVITIES


GRADE LEVEL
9
10
11
12
ACADEMIC SKILLS
OCCUPATIONAL PREPARATION
(PRE-VOCATIONAL)
(SPECIFIC SKILLS)
WORK EXPERIENCE
PERSONAL DEVELOPMENT
PERSONAL & VOCATIONAL GUIDANCE
PLACEMENT
AVOCATIONAL ACTIVITIES
4-YR. COLLEGE
COMMUNITY COLLEGE OR TECH. INST.
ADULT OR CONTINUING EDUCATION
EMPLOYMENT

The most important feature of such a curriculum is that it is learner-oriented rather than process- or subject matter-centered. The integration and interaction of the components will be a result of careful systems design. There will be no discrete demarcation between academic and vocational skill training or between these and other parts of the system. The truly integral curriculum must be developed so that each activity relates logically to all other activities and leads to the efficient attainment of the behavioral goals.

A massive research effort is required to develop and validate this system. Such an effort is currently feasible and can produce significant improvements in the learning process. An "organic"[1] curriculum, as envisioned, would necessarily have to be challenging and motivating to each student. It would probably use appropriate self-paced and self-instructional technology and maximally accommodate individual differences in learning rate. It should be designed so each student will succeed, and yet it should be rigorous in level and content. Furthermore, after thorough experimentation and revision, the integral curriculum should be capable of implementation in or adaptation to many different comprehensive school systems in the nation and it should be cost/effective in the implementation stages.

In general, the overall design of this curriculum should:

1. Integrate academic and vocational learning by employing vocational preparation as the principal vehicle for the inculcation of basic learning skills. In this way, learning could be made more palatable to many students who otherwise have difficulty seeing the value of a general education.

2. Expose the student to an understanding of the "real world" through a series of experiences that capitalize on the universal desire of youth to investigate for itself.

3. Train the student in a core of generalizable skills related to a cluster of occupations rather than just those related to one specialized occupation.

4. Orient students to the attitudes and habits that go with succesful job performance.

5. Provide a background for the prospective worker by helping him to understand how he fits within the economic and civic institutions of our country.

6. Make students aware that learning is oriented to all of life and need not, indeed must not, stop with his exit from formal education.

7. Help students cope with a changing labor market through developing career strategies that can lead to an adequate level of income and responsibility.

8. Create within the student a sense of self-reliance and awareness that leads him to seek out appropriate careers with realistic aspiration levels.

There are many unanswered questions that must be researched before such a curriculum can become operational. The problem of logistics alone is large and complex. How do you control the flow of students through the program without inhibiting individualized learning? Without the traditional "Carnegie units," how can school accreditation be achieved? As the roles of teachers change, will the emerging roles be acceptable? Would this system work better in a 48-week time cycle than in a 36-week cycle? How can the guidance activity contribute more effectively to accomplishing the system objectives? How can present instructional media be most effectively used and what will be the nature of required new media? What are the problems included in cataloguing and programming the specific behavioral objectives of an entire curriculum, especially one as ambitious as this?

These and many other fundamental questions must be answered before we reach the preliminary phase of what could become an overall program for general and vocational education.

Current Programs on Curriculum

While most of the research and development efforts in curriculum have been small and fragmented to date--directed to the improvement of a particular subject matter area--more recent pilot efforts to redesign an entire curriculum are in evidence. A number have been focused on the problem of keeping young people in the system long enough for them to benefit from the experience. The most important feature that characterizes these efforts is the integration of two educational areas that have been traditionally quite separate--the academic and the vocational.

In Richmond, California, for example, a major effort was made to integrate the vocational and general educational curricula. This was done by redesigning the content of traditionally taught subjects so that they related as much as possible to job training programs. Mathematics was taught by means of job-related examples and problems. Communication skills were related to performance requirements on the job. What were at one time judged to be potential dropouts in the tenth grade became, by their senior year in high school, candidates for technical training at nearby junior colleges.

Another effort in relating the verbal skill-oriented high school's general education program to the interests of many students was carried out by an MIT curriculum study group last summer. Working with a group of dropouts, they successfully managed to capture and hold the interest of youngsters who rejected the normal pattern of schooling. It was necessary to develop a free interchange among the different academic subject matters, bringing together various pieces of learning into a cohesive whole, in which these areas are not fragmented but have an overall direction and purpose. By following this course of action, the possibility of early failure was minimized as youngsters moved from the relatively unstructured atmosphere of the elementary school into the more structured curriculum of the secondary school.

Job Corps centers have provided an excellent opportunity for designing learner-centered programs independent of many of the traditional constraints. In trying to define what the end product of such a program should be, the Job Corps' educational planners determined that the economically self-sufficient, socially adaptive citizen needs many of the things offered by the traditional school system and many that are not. He not only needs basic educational skills but he also needs to know about the workings of our society and his role in it. He needs to develop a realistic and favorable self-concept, he needs several career strategies to be able to operate effectively in our free enterprise system, and he needs the personal development that will permit him to make socially adaptive responses.

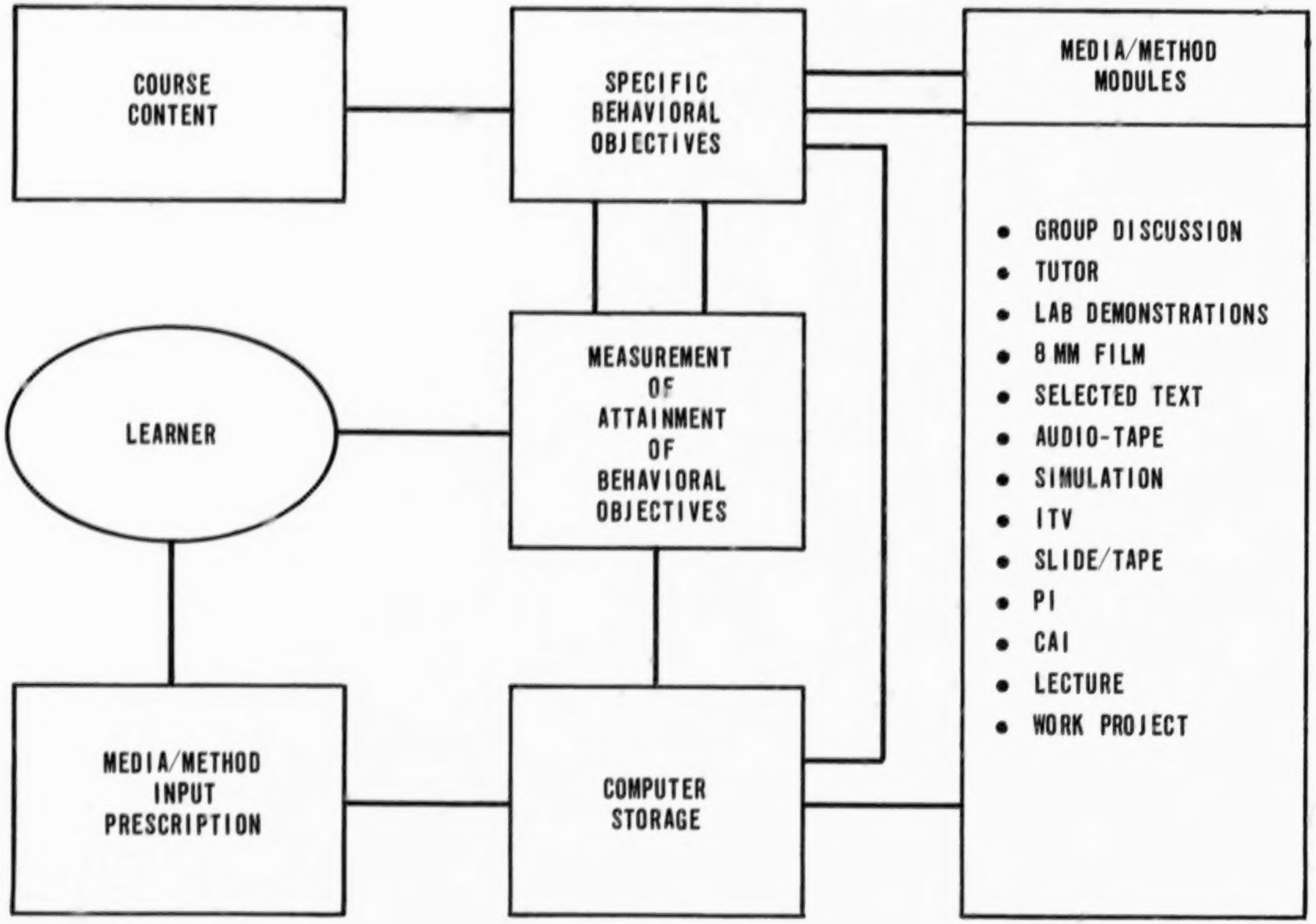
The Curriculum Program Plan

These and other experiences point up the need for a coordinated research effort that can lead to the construction of an organic curriculum. A first step would be the specifications of behavioral objectives. Following this, the appropriate course content would be selected or developed. Having in mind the subject matter to be learned, the instructional strategies would then be designed. These strategies require the selection or design of modular instructional activities that would use whatever media or method or combination of these that appear to be most appropriate for the attainment of the objectives. The method/media mix for any given sequence of objectives might include programmed instruction, single concept films, text readings, tutorial sessions, group discussions, computer-assisted instruction, and slide-tape presentations. The optimum mix of learning experiences would be developed by systemically varying the method/media combinations and testing for their teaching effectiveness. (Figure III-2 is a functional flow chart of a systems-designed instructional model.)

This validation of the learning experiences requires sensitive and sophisticated instruments for frequent measurement of behavioral objective attainment. Implicit in this system is that the student only learns what he does not already know and that he will move as rapidly as his ability and motivation permit.

The behavioral objectives and information about what method/media combinations are most appropriate for teaching students of varying abilities and interests are stored in a computer. When the student enrolls in

FIGURE III–2
MODEL FOR A SINGLE COURSE INSTRUCTIONAL SYSTEM


COURSE CONTENT
SPECIFIC BEHAVIORAL OBJECTIVES
MEDIA/METHOD MODULES
• GROUP DISCUSSION
• TUTOR
• LAB DEMONSTRATIONS
• 8 MM FILM
• SELECTED TEXT
• AUDIO-TAPE
• SIMULATION
• ITV
• SLIDE/TAPE
• PI
• CAI
• LECTURE
• WORK PROJECT
LEARNER
MEASUREMENT OF ATTAINMENT OF BEHAVIORAL OBJECTIVES
MEDIA/METHOD INPUT PRESCRIPTION
COMPUTER STORAGE

the course, he is measured in terms of his entry performance on a representative sample of the behavioral objectives, and this information is fed into the computer. The computer then looks at the characteristics of the student and how much he already knows and prescribes an empirically validated learning package for him. When this package is completed, the learner will be retested, and the next learning package will be prescribed.

This will be "programmed instruction" in the broadest and most desirable sense. The student will have almost immediate knowledge of results, will work at his own rate, and will have a high proporation of success experience in the learning situation. It is likely that much of the material in this system will be self-instructional.

While this experiment includes single courses only, the model should prove equally effective with an entire curriculum. The utility of such an instructional system in the curriculum that has been described should be clear. Indeed, the curriculum visualized probably could not work without such a flexible and individualized instructional program.

A study that systematically analyzes the effect on learning of all the major variables should have great value for educational planners, but it is only a first step in building an optimum curriculum. Much research and validation of program elements must be completed before a new system can be installed in a school for practical testing. The criteria for measuring the success of a systems-designed curriculum must include longitudinal data on the posthigh school performance of the students. It is encouraging to note that the resources essential to such an undertaking are available and that there are schools willing to participate in these innovational activities. The concept of a truly integral and excellent educational experience can become reality for the nation's young people.

Chapter 9

AN INDUSTRIAL APPROACH TO OCCUPATIONAL TRAINING

by

Wilbur E. Landis

The majority of U.S. youths enter some sort of occupational endeavor on leaving the secondary school level of education. Not enough of us have been concerned with what happens to these posthigh school youngsters. What are they prepared to do? What follow-up is made to determine their aims, successes, or failures? Most are coming to industry and commerce in search of jobs or training for employment. Thus, it becomes the civil responsibility of business and industry to face up to our past social oversight and to develop these people into useful, productive citizens. It becomes the duty of the schools to prepare these youngsters better while in school to enter the world of work. And it becomes the responsibility of the federal government to assist both industry and public education to coordinate their efforts to this end.

Not too many years ago, when industry in this country was smaller, the numbers of capable workers were plentiful and educators were teaching mainly the 3-Rs, factions of our society (industry, public education, and government) were entirely separate functions with little or no cooperation between them.

Our philosophy at the Chrysler Corporation is to train those individuals who need training in areas not possible through public education.

Institutional Training

We afford all of our employees the opportunity for job-related training through our Tuition Refund Program, even paying tuition for courses leading to high school graduation if the employee did not receive his high school diploma. We encourage all employees to participate in this program for it not only makes a better citizen in the community but also a better, more advanceable employee. Many have taken advantage of this opportunity; many have received college degrees through this route. We are all the better for it. This is what we have come to call institutional training, and we cooperate with the public educational institution for this particular training need.

In other situations demanding training as a solution to a particular skill shortage problem, we call on our third partner--the government--for assistance. For example, in 1963 due to an acute shortage of qualified arc welders for employment in our Stamping Division, we made contact with the Michigan Employment Security Commission for the purpose of setting up an arc welding course of instruction at a local vocational high school. In a short time the MESC screened and enrolled qualified trainees in the welding course to meet our needs for this skill. We had the same fine cooperation for a tool and die machine operators program. While we are filling a production need via these training courses, we also take a certain pride in helping the community with its problems concerning their unemployed and underemployed citizens.

This same type of institutional training is being used currently in our Body Drafting and Clay Modeling schools. The level of the skill does not necessarily dictate the method of training to be used. These two courses represent the highest skills in the company. The courses were set up through the cooperation and efforts of Chrysler, Highland Park College, and the Michigan Employment Security Commission. Interestingly, the physical facility for these programs is a secondary consideration--the course content, teaching materials and aids, classroom equipment and a qualified instructor are most essential.

The Body Drafting school was set up in a vacant store, which was rented under the auspices of the Manpower Development and Training Act. Funds under the Act were made available for the school. The course is conducted for 40 hours per week for a period of six months. Trainees who successfully complete this course are hired into our Engineering Division for more advanced training. We were fortunate in obtaining a Chrysler retiree who, before retirement, had been a drafting instructor in our Engineering Division.

It was decided to use the curriculum currently used in our own drafting school in the Engineering Division. This arrangement has many advantages; one is that the basic fundamentals are being taught to the students. Another is that Chrysler's methods of operation and standards were embedded in the program, making it much easier to assimilate the graduates into the company's drafting rooms, with the students fully knowledgeable in the corporate procedures, policies, and work processes.

Unemployed people were screened for this program by the MESC and our Engineering Staff. Fifteen students were enrolled in the first class, and 18 in the second. Results were less than expected in the first class due to the selection standards. It was necessary to raise the selection standards to obtain only those people who could later qualify for the high standards demanded by this work.

Our Clay Modeling School is unusual in that there are only two other schools of this type in the United States; one on the East Coast and one on the West Coast. If you are not familiar with clay modeling, it is simply the reproducing of a model design in clay. Everything that is done in the design of a new car or new model is first developed as a drawing by an artist and then produced in clay, similar to what a sculptor might do in preparing a statue.

The unique method of selection used is of interest. Again, we cooperated with the MESC and the MDTA, and were able to rent an unused automobile showroom for our classroom. First, we searched the MESC records for all applicants who showed any indication of having artistic talent or an interest in art. These young men were called to submit applications for the Program. An examination of their applications showed whether they were unemployed or working in a gas station, a car wash, or performing other such tasks not related to their artistic talent.

Next, a selection committee was set up, including representatives from the MESC, Highland Park College, our Personnel Department, and a chief stylist from our Engineering Division. This committee sat down and initially interviewed all the applicants, after which the chief stylist gave them some rudimentary instructions on how to make a clay model, a plastic model car, and five pounds of modeling clay. They were instructed to return in one week with their completed clay model so that their model could be reviewed to determine if they had the basic artistic talent necessary to learn this job.

The Program runs for 45 weeks and covers all phases of industrial sculpture, including:

1. The techniques of using sculpture tools.
2. How to work with blueprints and templates.
3. The construction of armatures and bucks.
4. How to sculpture 3/8" scale and full size automotive models and related components.

The students ranged in age from 18 years to 36. All were high school graduates, and several had a year or more of additional training in colleges or art schools. These students progressed at their own speed, rated by their level of attainment. As they qualified, they became employees in our Model Rooms, and replacements were recruited for the class.

We know today that some of these men will become outstanding clay modelers. Because of the degree of skill required in this type of work, it is not difficult to say that these men will be eventually making an annual salary well up in the five figures. I might also add that out of the 23 original students in the class, nine were from minority groups.

The types of industrial skills for which training is necessary are boundless. A case in point occurred the day our Technical Education Department received a call from our Central Transportation office. This office is responsible for all intraplant material-handling, most of which is done by the conventional tractor/trailer truck hauling. The office had been running some attrition studies on its manpower, the results of which strongly indicated an immediate future shortage of drivers for these intraplant rigs. Here again, cooperation was obtained from Highland Park

College, the MESC and MDTA. This Program was set up at the Michigan State Fair Grounds where students were able to get actual on-the-road training. Chrysler supplies trucks and engines for the classes, and also had the Safety Director for our Transportation Division work with the Michigan Trucking Association in setting up the curriculum.

Trainees were selected from the underemployed or unemployed who had registered with the MESC. This is a shorter program of four weeks of training. So far, we have started 131 in this Program, of which 129 finished. There are some 23 currently enrolled. Many of the men who were in this Program now own their own trucks and are making at least $3.08 an hour. Our interest in this particular training was twofold. One was that we needed truck drivers, but in addition, we were also giving nonskilled workers a skill; thus, there was a civic responsibility that we felt was very worthwhile.

Not all industrial training requirements lend themselves to the straight institutional type of training method. Many times this method must be fortified with supplementary training within the industry. An example of this requirement is shown in our Industrial Power Sewing Machine Operations Program. These employees sew automotive interior trim fabrics using heavy duty power sewing machines. These machines and processes are quite unlike those found in the commerical furniture upholstery industry, so workers from this industry were not available to us. Using the same MDTA channels, we set up a course, using a local vocational high school and a curriculum jointly worked out by Chrysler and the school officials. This course was designed specifically for power sewing operations in Automotive Trim. Four hundred training hours after the start of this Program, 204 trainees (of which 95 percent were from minority groups) were hired by Chrysler to perform on-the-job training until they were completely trained in this field.

This Program probably is one of the most successful we have held from the standpoint of taking unemployed women, giving them a semiskill, and producing operators for our Trim Operations. Just recently, I contacted the Superintendent of the department responsible for Power Sewing Machine Operations, and he informed me that he has had great success with these women. Not only do they continue to be very productive, but also he states that they have become the backbone of his department. This speaks well for the program and for the motivation of these women.

Some of the training requirements of industry brought about by rapid technological change have outstripped the ability for public institutions to keep pace in course content or curriculum offerings. One such field is that of electronics--more specifically, "static controls" and solid state applications to control panels and equipment. Applications of these devices are found in new machine controls, numerical controlled machines, and welding control panels. In simple arithmetical addition--industry is buying these new innovations faster than it can train men to maintain and repair them. However, we are trying.

We have developed a program dealing with the training and retraining of our employees who are responsible for this sophisticated equipment. One purpose of this program is to train these employees to maintain and repair these machines and equipment properly and to certify them as qualified on successful completion of the training.

Included in the course work of this program are not only electricity and electronic principles, but also work in pneumatics, hydraulics, introductory courses in computer systems, programming, and servo mechanisms. Currently, we are developing a Pilot Audio-Video Tape Program in control panel work. We hope to use this approach in either direct audio-video hook-up from the machine on the floor to a plant conference room, preserve the operations on tape for later or more remote use in another plant, or bank programmed tapes for complete classroom course work. The conversion of the video tape to 16mm sound film is another possibility. I feel that the possibilities of incorporating this concept in technical training in industry are endless.

We are aware that training equipment and specialized training aids are expensive and sometimes impossible to come by. Although we required this equipment each time we conducted technical programs at our plants, we could not stock duplicate sets of this material at all our plant locations requiring training.

To maintain a central location housing this equipment and requiring the employees to travel from their plants to the classroom for training would entail considerable time lost just traveling to and from class. To surmount this problem, the concept of taking the classroom to the plant resulted in our Mobile Training Unit. This idea is not new to the world but new to Chrysler, and it solved our problem. Currently, classes are conducted in many specialized courses at the plant site. The employee need merely step from his work place in the plant to the completely equipped, air-conditioned classroom in the plant's parking lot. Additional units are planned as training demands become heavier. Courses offered in the unit include basic electricity, industrial electricity, basic electronics, pneumatics, and hydraulics. One benefit of this method is the proximity of the trainee to the machine or plant problem being studied; he merely steps back into the plant from the unit for practical application of a given lesson.

Apprenticeship

Another training method that Chrysler uses is apprenticeship. Apprenticeship is learning by doing. Before World War I, all of this country's skilled artisans had migrated from the "old country" where apprenticeships had been the main form of training for centuries. There was little or no apprenticeship training in this country at the time.

Between World War I and World War II, this country did little training in the skills through apprenticeship. This fact was brought into critical focus when we began looking around for qualified skilled workers such as diemakers, toolmakers, and electricians. They were in extremely, if not dangerously, short supply. The federal government, in an effort to correct this situation, established the Bureau of Apprenticeship and Training within the Department of Labor for the purpose of promoting and assisting industries of all sizes and types in the area of industrial training. Management and unions have joined in the common effort of training people for the skills required by industry. It would be interesting to poll this audience as to its individual conceptions of what a skilled trades apprentice is, how he qualifies for apprenticeship, and what it takes to be successful in the program.

New and swift technological advances in many phases of our supporting industries have not simplified the knowledge or skill requirements of our skilled work force. Using this premise, we can assume that the training required to keep pace has also advanced and become more complex. This concept has a direct bearing on the screening and selection procedures for training in apprenticeship.

In any training program, the success of that program depends on the capability of the trainee to **assimilate** the information and material contained in the program. In the testing procedure used for apprenticeship at Chrysler, we use our own Personnel Test as a preliminary screening instrument to screen out those applicants who would not be successful on our test battery. The battery consists of these tests:

1. Chrysler Reading Comprehension

2. Chrysler Arithmetic

3. Purdue Industrial Math

4. Tool Knowledge

5. Space Reasoning

6. Shop Arithmetic

7. Mechanical Aptitude (Purdue)

8. Mechanical Comprehension (Bennett)

9. Object Visualization

Results of this battery are only a part of the final selection material of the apprenticeship candidate. Other criteria considered are high school graduation, high school transcript of credits, grades in certain courses, conduct during the personnel interview, and all posthigh school educational endeavors.

We place apprentices on the program strictly in line with their qualifications. That is, those best qualified are the first placed.

Once on the program, the apprentice is scheduled through 7,328 hours of on-the-job training in the plant department and 672 hours of related training at a local college.

The apprentice of the caliber currently in the trades can assimilate college courses readily. In fact, at the end of his apprenticeship, he will have earned about two-thirds of an associate degree. Many of the graduates of this program are now members of Chrysler management and supervision levels. Of the 1,060 apprentices currently on the rolls at Chrysler, 250 of them are training under the Manpower Development and Training Act.

We have carefully evaluated literally thousands of high school transcripts of aspiring apprenticeship applicants. We find that the high school courses most important to a student entering and successfully completing an industrial apprenticeship are:

1. Mathematics
2. Drafting
3. Machine shop
4. English (communication skills)
5. Sciences (physics and chemistry)

Where the schools teach mathematics, we teach the application of mathematics; and we all know that mathematical training stimulates reasoning ability in other fields as well.

Drafting is important as a basis for applied drafting and blueprint reading. It sharpens the students' abilities in object visualization and spacial relationships.

Machine shop is not necessary in high school as an operations training type course, but more an exploratory venture. It would be unfortunate if we started an apprentice in the tool making trade only to find shortly thereafter that he disliked machine shop.

An area that seems to be getting less and less attention is that of the communication skills. It must be kept in mind that all people in industry must communicate, and some must communicate more than others. Whether written or oral, instructions are required. They should be clear and concise to avoid costly errors or misunderstandings.

Basic scientific principles are found in every trade in industry. Understanding these principles simplifies entering apprenticeships, and also makes an apprenticeship program more meaningful.

Getting into an apprenticeship program today is more difficult than getting into college. There are two primary reasons for this fact--one is that the entrance requirements are about the same and the second is that there are fewer openings available. We will continue to select the best we can get in their order of qualification.

Running concurrently with our Industrial Apprenticeship Program is our Automotive Technicians Apprenticeship Program. This program was developed under a National MDTA Contract in 1965 and is operating successfully with more than 1,000 apprentices enrolled. Trainees for this program must successfully complete a series of qualifying tests administered by the local State Employment Service. Automobile service training is accomplished in the Dealership Service area on the job. Through the cooperation of the Department of Health, Education, and Welfare, funds are provided to conduct related training classes at the dealerships with our company's sales training mobile training units.

Summary

Training within industry is growing rapidly and is enjoying greater stature than before. We are training in every technical area, and more programs are being developed as our industries prosper and grow. We have an abundance of materials, machines, and money, but not qualified manpower. The value of the first three is small without the fourth--manpower.

The problems at Chrysler are microscopic in themselves but add them to those of all other industries in the nation and we may find we are in trouble in the world market. A case in point is Japan, maker of some of the finest electronic equipment in the world. Once a noted follower or copier, Japan is now a leader in many areas. Some of our largest companies import electronic components from Japan to assemble into their products. The result is that the small island of Japan is an economic threat to the United States. Fortunately, there is still time--we have been caught in pinches before. New and updated educational programs in our vocational and technical high schools are being established, greater interest and cooperation of all levels of our government is developing, and industry is becoming aware that training in these critical areas must be accelerated.

The cooperation among industry, education, and government will go far toward solving many of our socioeconomic problems.

Discussion

Mr. Kotz:

What are the different levels of training offered by Chrysler at college, technical, and entry level?

Mr. Landis:

The normal training situation, especially in the automotive industry, is one in which we must contend with changing requirements. We have a change of model every year. This creates training problems for each specific model. The Chrysler Institute operates under a corporate staff arrangement. First of all, the Institute is composed of four major areas. One is the Chrysler Institute of Engineering, which has a Master's degree-granting charter, where we train college graduates for a Master's degree in automotive engineering. Sales and service training is the second area. The third area is management education, and the fourth is technical education. The Institute has the responsibility for developing curricula and training for any subject or training technique that is required to cross group lines. The Corporation is organized into four major groups: car assembly, staffing power training, and the engineering group. For instance, the numerical control, maintenance parts, and programming areas cross group lines, so this is our responsibility. We have training programs in quality control, but to give you an estimate of how many people we train in a year would be difficult for me to do. It certainly numbers into the thousands at present, and we expect to expand it considerably in the future.

Mr. Kotz:

You personally have responsibility for the training in the technical areas?

Mr. Landis:

That is correct.

Mr. Kotz:

The other areas may have different requirements and specifications. It comes across very strongly in your paper that you like to have the applicants have a high school education at least, for technical training. Is this true of most of your training programs in the other areas?

Mr. Landis:

No. What we are saying is that we have a screening test. This is a general test given to any person entering the company for any employment. It is designed to test achievement at the level of fifth or sixth grade arithematic. There is nothing, as you can see, that would indicate a man's potential beyond entry level. This is the level at which you are able to communicate with people. They understand instructions, and passage of the test pretty well tells you that they most likely can be a successful employee--given proper work attitudes.

Mr. Kotz:

Do you, in your upgrading program, also use tests as well as performance? Employees at lower level positions may be prime candidates for upgrading. In your personnel program, is it performance only or do you use formal tests as well to help decide who should be upgraded?

Mr. Landis:

It is performance as well as training. Everybody in the corporation has a right to use the tuition refund program and take training that will help them improve themselves for a step higher in the job level. I mentioned that many of our employees are using this approach. We have an extensive upgrading program.

Mr. Kotz:

To what extent do you consider or hire people who have a high school education as opposed to those not completing secondary school?

Mr. Landis:

Naturally, we are hopeful that people come into our organization with a high school education. But that is not a criterion for anything but our apprenticeship program. On the other hand, you can have people come in at too high a level of education. You can hire people too highly qualified for a specific job.

Dr. Thomas:

Since my field of work is educational philosophy, I am concerned with theories of instruction. When I have a chance to talk to somebody like Mr. Landis who is very modest on theoretical matters, I want to probe for his conception of instruction. I am interested in finding this out from all of you here who have the responsibility for any vocational education. I am also very intrigued by the concepts of economists in the group, in the way you figure benefits over costs in deciding on the value of some proposed program and effectiveness compared with costs in looking at what I would call the intrinsic relation instead of the extrinsic relation. This is something I will have to take back and tell my philosophy friends--that their theory of values with extrinsic and intrinsic relationships has parallels in economic analysis that qualify and make more objective the process of forming judgments. The points I want to raise fall in both areas.

One is on the theory of instruction. One aspect of the theory of instruction that I am very strong on is that you have the whole person learning at a given time. You are not training his muscles one time, his artistic sensibilities another time, and his intellect at a third time. All of these are simultaneously involved in any act of learning, and one of the troubles I have found with some traditional conceptions of vocational training is that they try to emphasize skills and routine habits without having any of the emotional or intellectual dimensions included.

The big thing I find wrong with what goes on typically in Grosse Pointe high schools is that they emphasize only the intellectual and make it tedious rather than stimulating. It is the kind of education that reminds me of cut flowers. You cut them from the roots and carry around the intellectual blossoms and watch them wither and fade. The only way to keep them permanent, on a long basis anyway, is to keep them attached to their roots. So I would like to know whether these employees in the training program offered by Chrysler are learning some intellectual dimensions with respect to working for Chrysler. Are they learning about shortages and oversupplies in labor as expressed in wage rates? Do they understand how wage rates are set? Is it set by a supply and demand formula that operates freely, or is it a highly contricted operation depending on contract negotiations with the unions?

Another dimension that I consider an intellectual dimension of vocational education is the source of job satisfaction. This has been pretty well studied in terms of four or six major categories that take in most of the kinds of satisfactions that people get on the job. The rate of pay is very seldom the main source of job satisfaction. It is very high as a source of job dissatisfaction, and that is a subtle but important distinction. People complain about their low pay, but they do not identify high pay as one of their major sources of job satisfaction. Associations with colleagues, associations with the supervisor, and amount of discretion and judgment allowed on the job are all important. I think this is an intellectual matter to be studied in connection with the preparation for vocational work and not something to be pulled out of context and taught separately at some high school over the hill. These questions are directed to all of you, as much as they are to Mr. Landis. Then I would go on to the problems of union membership, union management relations, and the means and channels of promotion. I would like to know where these employees are learning those, if they are, and they may be learning it on the job incidentally or there may be something more systematic about it than mentioned so far.

Another point concerns the tuition refund program, where Chrysler would pay for the cost of a person continuing his high school education until he graduates. Mr. Landis made that a matter of civic pride. Here is where I get interested in the economists' technique. I would like to ask if he has any evidence that encouraging employees to finish high school is a better use of Chrysler money than some alternative. It is too bad you have not heard the last two days' sessions to get the full impact of that kind of question. I would even encourage you to let some of these other people answer that for you, if there is any evidence that finishing high school has a higher ratio of benefits over cost than spending your money on some other aspect of employee development.

A third point concerns the body drafting school you mentioned. On the basis of the heavy use of Chrysler curriculum materials in that school, I wonder whether you hire all the graduates of this program. If not, what can they do after they have been studying only Chrysler materials. Also, is there any training program aided by federal or state funds in which all of the automotive industry cooperates in educating workers vocationally? From my conversation with Mr. Landis, I suspect there is one. Another rather specific question I would like to ask is about the mobile training unit. Is this highly localized operation, available only to Chrysler employees in the plant, financially aided by state or federal sources?

My last point concerns the economic threat of Japan's electronics industry. The fact that Japan produces electronic components so efficiently and expertly may be a reason for developing an American training program to train workers in this country to produce electronic components more efficiently and economically. If that were submitted to a benefit/cost analysis, on what possible grounds could you justify instituting an American program when the Japanese are now doing it so well? I would like to see what the economists would say about that, because I suspect the answer may be instructive to some of us who are worried about getting adequate federal funds for vocational programs in other areas that have as dubious a benefit/cost ratio.

Mr. Landis:

I would like to reply to your last question first. I used Japan only as an illustration. The point is that we are not importing skilled help from other countries as we formerly did. What I was alluding to is only an illustration of what is to come. Our problem in America is getting to the point where skilled help does not have the full capability that one in the trade should have, and this is a costly situation as far as our competitive position with other nations is concerned. We must put the capability in our own work force members so that they have a complete knowledge of the specific trade they are in. If we do not then we are priced out of the market for the simple reason that you have to have too many people to do the job that ought to be done with full capability of the people who are here.

Mr. Kotz:

There were many things in both your paper and in the discussion that were fascinating. One is the point raised by Dr. Thomas about whether encouraging employees to finish high school is a better use of Chrysler money than some alternative uses. We all noted the pride that Chrysler takes in this particular type of activity. In terms of this use of Chrysler's money, I would wonder if there is not some benefit to Chrysler in training people in public school systems to fit certain Chrysler jobs. I am not sure how it would be on net balance.

Mr. Landis:

First of all, let me clarify this tuition refund. This was done in 1964 by a mutual agreement and contract negotiations with the UAW-CIO, and it is not done only by Chrysler, but also by General Motors, Ford, and other companies. There is a meeting of the minds of both labor and management on this program. I want to make that point clear, that we do not take complete credit for the program. The company pays the tuition. Secondly, and this is only our opinion, we think the prestige and the psychology of having a high school diploma has been strongly imbedded in a lot of people's minds. We also think there has been too much emphasis on everybody going to college. It has been difficult for us to get sufficient numbers of people who are capable of going through the skill trades area. Persons with great mechanical aptitude would be much better off taking the apprenticeship program and moving up that route into management positions. The vice-president of our quality control area happens to be a graduate of our apprenticeship program. There is a real avenue for proceeding up a career ladder. As to whether a high school diploma in relationship to some other kind of training would be more valuable, I could not tell you. To people in the United States, a high school diploma is expected of everyone. The young man who is taking vocational education in high school proves or indicates that he has the motivation and interest in the area. We are not concerned with what you teach him specifically for the simple reason that it is our responsibility to teach the trade or the particular operations that apply to the job he will be expected to perform. We may be dealing with the same kind of vocational training you might give in high school, but we recognize that you have to find out if they have the interest. Vocational education is a way to find this out. We have to do some unteaching because of what they have been taught in certain instances in the vocational situation.

Mr. Kotz:

Could you possibly give one example of this "unteaching" in one skill area?

Mr. Landis:

I am talking about the operation of specific machinery. You will find that most of the equipment in the vocational high schools are antiquated. The basic theory of how a lathe or a drill operates is fine, but from the standpoint of applying a general theory or technique to things that are unique to or more sophisticated in our plants, it can create confusion. Our procedures may be entirely different, and usually are, than those taught in the classroom situation in vocational schools.

Mr. Kotz:

So you would prefer that this training be done in the plant?

Mr. Landis:

I would prefer that you find out if the youth has mechanical aptitudes and the interest. As far as any real training is concerned, if there is a lesser amount of that given, it makes no difference in our hiring policies and practices, and there are instances where it creates a hardship.

Dr. Stromsdorfer:

Again, I would like to bring up the point that if the training is broadly general, the subsidy is to the student and not to the company. I would think that such things as teaching clay modeling is broadly general, because one can be a clay modeler and can work at Ford, Chrysler, or GM. You may be subsidizing the industry, but you are not necessarily subsidizing any given company.

Mr. Landis:

Ford hired people from this same school. It so happens that GM did not, but it could.

Dr. Stromsdorfer:

The other question I would like to ask is under what conditions would Chrysler train semiskilled people rather than rely on MDTA training? Does Chrysler, in some instances, encourage the establishment of specific types of MDTA courses, and if so, what portion of this cost does Chrysler bear?

Mr. Landis:

While here in Washington the last two days, I made a presentation to the Department of Labor, offering to train 500 hard-core people. We will supply the facilities and the conference rooms in our plants. We feel there is only one thing lacking in training hard-core people at present. They do not get into the environment of seeing productive people operate. What we are proposing is that the conference rooms would be in the various plants of our corporation. There would be only ten people in each class. We would provide an instructor and some counseling. This is only a proposal; the Department may not buy it. We have only established the principle, but we say that, as an example, when you are teaching hard-core people who may not be able to add, you use cams and gears and cotterpins instead of apples and oranges. Then you take the people out in the plant and show them the application of these things used in the classroom on the job. The theory is that we can give the basic training to hard-core trainees the same as is done in the present school system, but we have the added advantage of continually having the students see productive people doing a job. With this environment added to the training, we can get people motivated, not only faster but in greater percentage than the criteria or the response up to this point in this particular area.

That gets me to the second point of MDTA. To bring these people into our organization when they are basically trained, we have to upgrade the skills of the present work force. You do not bring people in from the outside and superimpose them on people who are already there. We would be getting a vertical escalation for the people we already have to bring these people in to the lower occupations. It so happens that once you train a hard-core person, the opening job will run about $500 a month, which puts him into the productive society, and he immediately becomes a taxpayer. We think this is the way to do the job. But we certainly are not going to do it at the expense of our people that are already employed. They have to be upgraded. The second point is that the company is a profit-making organization. We are willing to offer the facilities--the heat, light, gas, and conference rooms--at no cost to the government, but we do not think we should mix up the profit side of our business with some philanthropy and do the rest of it just on a community interest basis. If you want foundation money, then ask for it but not for a project of this kind.

Mr. Kotz:

What would be the rest of the things you would ask MDTA to pay for?

Mr. Landis:

We would ask for the administrative costs for the people required to make it a successful program.

Mr. Kotz:

On the subsidy question, before we leave it, Dr. Stromsdorfer quite correctly suggested that the general training is not a subsidy because it could be used throughout the economic society. The specific kind of training that would be related to equipment and procedures peculiar to a particular industry or a specific company would be a subsidy. You indicated that the latter kind of training you would rather do yourself. Did that come through clearly to me and to the rest of us?

Mr. Landis:

It comes through clearly. We are not so concerned about the work processes or mechanical application in a vocational situation in a school system. We are concerned that you give us people who have mechanical aptitudes and are motivated.

Mr. Righthand:

I think Mr. Landis understates the case for the automotive industry. Of course, he is speaking for Michigan. This issue of wanting a general product and letting industry train in specific job skills and procedures is not the policy of Chrysler throughout the country or General Motors. They provide teaching and training institutes for the automotive industry. I know that the economists are worried that we are training for a specific industry and subsidizing that industry. We are not. Here is an industry that feels one way and yet we are not concerned with that. We know other industries want a training product; a graduate of the course who has the skills to do the job, but to the credit of Chrysler and General Motors their workshops are conducted every year. We have worked out an arrangement with the state college so that degree credits are provided toward a bachelor's degree for those who take these workshops. Also, credits are given to the instructor so he can move up the salary schedule. There is no cost of attendance at these institutes, just maintenance, and the state pays the teachers.

The dichotomy problem of vocational education has come up again and again. One of the speakers felt there is a conflict between comprehensive area schools and the apprentice institute. From Mr. Landis's presentation, you will note that Chrysler is using all the approaches. It has used MDTA and has indicated that it was given in a vocational school, and those of you who are benefit/cost minded and are ready to shut down that school--remember, this is a benefit you have to consider. Also, he is not concerned solely with apprenticeship or institutes, he uses both approaches. This is similar to what we do in Connecticut.

Mr. Kotz:

One comment on the benefit/cost approach. We are just at the start in applying it in educational planning and programming. I think what has come out of the conference so far is that we are just beginning to set out theoretically what ought to be included in the benefits and in the costs. We need much more dialogue because there are many elements that are being missed because of a lack of adequate communication. It is unfortunate that in the discussions some felt they were defending the realm of education against the enemy who were armed with benefit/cost tools, while others, perhaps to elicit more information, might have been cast in the role of aggressors. Are decisions or judgments being made explicitly based on benefit/cost analysis? Robert Grosse said that HEW came to the conclusion to freeze vocational education at current levels of funding because there was not enough information coming out of benefit/cost analysis or other research to support a recommendation to expand the program.

Mr. Legg:

Mr. Landis, in this remedial training that is carried on, you take people in on the MDTA programs and you make them productive by utilizing both vocational facilities and plant facilities and acquainting them with the real world of work in your plant. Would you be as willing to take high school and junior college students and bring them in on the same basis, through a cooperative program arrangement with schools wherever your plants are located?

Mr. Landis:

Are you talking about putting them in relatively the same position as we would with the hard-core people we train under MDTA?

Mr. Legg:

Yes, but a preventive type of program rather than a remedial type.

Mr. Landis:

I think it has merit but we have so many problems with the immediacy of attending to the needs of the hard-core personnel through MDTA that it would have to be a secondary consideration.

Mr. Legg:

If we keep reacting to immediacy rather than to long range prevention, though, we continue to have the problem.

Mr. Kotz:

Mr. Legg is asking a highly relevant and provocative question. Why can't you run both types of programs at the same time?

Mr. Landis:

How are you suggesting we run them?

Mr. Legg:

Have you gone to the local school, presenting the problem of needing, for instance, those people in electronics assembly, presenting the kinds of people you would need, the kinds of training needed, so this could be scheduled into requests for funding and passed on up to get the kind of resources applied there to take care of this situation? In our bid for the total pot of educational support, unless this reaches a fairly high level in our government, resources in states and in the federal government may not be devoted to that particular kind of cooperative program.

Mr. Landis:

In December of last year, we got together with the representatives of the five community colleges that are in our area--metropolitan Detroit. We have a three-pronged goal. In the Detroit area there are approximately 5,000 to 6,000 apprentices, and we use the community colleges for our related training. The first two years of an apprenticeship are in the basic related training. Essentially all of the trades pretty much carry the same curriculum. After you move into the third or fourth year, each trade has its special subjects. As an illustration, a tool designer requires special courses, and any one company does not have many tool design apprentices because, first of all, we are by contract under a ratio basis, so you cannot have many. As an illustration, I would have four apprentices that needed a specific course at a given time. You must remember apprenticeship is an 8,000-hour deal, 672 hours of which is related training. The apprentice goes to these colleges eight hours a week on company time. We have to have these courses at the specific semester when they are scheduled. When the students have had all their on-the-job training, if they haven't finished the related training, they cannot become journeymen.

This is one of our problems in Detroit. We got the representatives of these five community colleges together. They agreed to interchange their credits, so if I have an apprentice going to Highland Park College, and Henry Ford Community College or another college is willing to take on the course, provided there are sufficient numbers to make a class of 15, for example, they would take that on. We would send the apprentice to that college for this particular course, and the credits would go back to Highland Park. We all think this is an excellent cooperative program.

The second thing is that the curriculum for apprenticeship in America has not been updated in 20 years. The next step is to give the schools something to work with. We have gone to Wayne State University, asking if it would act as a coordinating point where we could have experts from the educational field come in to update the textbooks. We, in turn, will supply the experts and tell them what we think the substantive reports ought to be so they can put them in proper form. In this manner, depending on cooperation all around, the curriculum is updated for electronics. You have to have it updated so that the apprentice learns, in the electrical trade, for example, how to maintain a numerical control tape equipment, which is all solid state electronics.

Another problem concerns the efficient use of community educational resources. Does it make any sense that five community colleges each have a $200,000 computer? One of them could be the expert in the computer area, another one, like Highland Park College, could be expert in clay modeling curriculum relative to the automotive industry.

We see a possibility of using Wayne State University as a so-called catalyst in a communitywide cooperative program where eventually we will register all of the apprentices in the Detroit area through Wayne State. The university would assign the apprentices to the schools according to the specific courses scheduled for them. Wayne State has a computer that should take care of the scheduling of 6,000 students easily. This shows the possibility of what can be done through cooperation between management, labor, and educators. Naturally, we will have to rely on funds of the Vocational Education Act of 1963 to get it started. Now this can become self-supporting, for the reason that you can raise the tuition cost of apprentices by $2.00 an hour or whatever is necessary to run the program. Once you get it off the ground and operating, you have a system that is second to none, in my opinion, because all of the companies will use it. We drew in the Employers Association in Detroit, which is an organization of employers and has some 300 to 400 company members. We drew in the International Union of the UAW. We have representation from the big three--Ford, General Motors, and Chrysler--involved in the planning. It is a fine example of what can be done, utilizing the brains and the interests of the leaders of several parts of the community. As we see it, everything we do has to be a four-pronged effort with management, labor, educators, and the government.

Mr. Legg:

Some of us see a more fundamental question here, whether direct federal support of activities or resources should go through the states to educational activities under public supervision, or to special training situations outside the regular educational establishment? In many instances, you may get quicker action by establishing training programs geared to a specific job and perhaps conducted in a school setting on the employees premises and not concerned with broader educational goals. But what about the long haul and the utilization of community and state educational resources? This may take more coordination and initial time, but it may, over the long run, supply better products and in many instances a steadier supply of qualified people in electronics or clay modeling or other job families.

Mr. Landis:

We are working through the state. Industry will pay its own bill in this particular case, once we get it off the ground. All we want is a start with seed money. Then, instead of paying $6.00 a credit hour, we will pay $8.00 a credit hour, and finance it through tuition payments. We will not need any money from anybody once we get the program operating. What do you think, Mr. Tuma?

Mr. Tuma:

My judgment is that it would be self-sustaining. It is a matter of fees. It really is not too different from the illustration you described in the clay modeling school, which for two or three years has been sustained by MDTA, but which is now becoming a community college endeavor. It goes back to the point I would like to register regarding subsidy. I think we have used this term rather carelessly. My feeling is there is very little direct, immediate, and specific subsidy money going to employers except for the small employers who do not have the capability of doing things on their own. Most of the instruction for very special processes or new methods of production and model changes, etc., are matters that have no relationship to federal funding. We are talking in terms of apprenticeship or technical trades, management, and the like. If there are certain funds available from either the school systems or from federal funding, we are putting those funds not into a company, but into individuals who will have transferable skills. One of the great problems in industry is that once a person becomes a highly skilled or professional or administrative employee, he has a marketable skill that he carries with him wherever he goes. I think this business of subsidy as we have used the term may not be very clearly defined. Without very careful study, we should not think in terms of subsidies as being a direct and immediate contribution to a specific enterprise. Rather, it may have a mix, and in a sense it might have an almost socialized characteristic, perhaps privately socialized in the sense that it may be a group of particular industries. Or it may have public value. At the same time, it has in many cases, immediate value to the person who is receiving it. It does develop within the individual certain skills that are transferable. I think we should exercise great care with regard to the use of this term.

Dr. Davie:

There are several questions that came to my mind after listening to this very interesting presentation. When you discuss the clay modeling program, you mention searching the records of the employment agencies for men. I wondered if you thought about women. I wondered if there was any real reason why, rather than just tradition, this is a job for men only. Another question I would like to have you reflect on is what the effect of declining automobile sales this past few months has been on your training activities? With respect to apprenticeship training, you mentioned the need to train people so they have a complete knowledge of the trade. I wonder whether that makes very much sense in today's world where trades are becoming so expansive in terms of their content that no doctor today really tries to learn all about medicine. I wonder whether we can expect plumbers to know everything about plumbing or machinists everying about machinery, whether we have got to think about the greater specialization in these fields, just as we have come to have greater specialization in other areas of employment.

One final question concerns your attitude toward vocational education in the high schools. You said that from your point of view, the real benefit was in selecting out those students with mechanical ability and motivation and not being interested in the detailed training. If that is all it really amounts to, I wonder whether there might not be a simpler alternative to discover students with these particular abilities.

Mr. Landis:

I will start with that one. First of all, in the area of auto mechanics where we supply motors and parts, we meet the request of any vocational school that writes in and asks for one. We give them the latest model. I should qualify what I say regarding that since I am talking about basic machine tools. Although you find the mechanical aptitudes of your students, there is not anything basically wrong with actually teaching them the various processes. My point is that, we will do this when we get the person. We will train them in our specific methods and procedures. In many instances, at least up to this time, it would be perhaps different than what would be taught in the schools. This brings up your point that maybe we need a closer relationship with the industry working with the vocational schools. We do a great deal in our speaking engagements. I have people in my department that average 10 or 12 talks a month in the area of vocational education.

Each job classification is controlled by a job description that outlines the work processes and in turn establishes the rate of pay. It is our responsibility to build a capability so that the individual has a complete knowledge of that job. But if you are paying the money for it through public education, you are not paying money to make a specialist. We are paying money for people who do not have full capability, and I do not think the illustration of using the medical profession can be necessarily applied here. If you are going to pay the money for the particular trade, then the man should have the full capability.

The next question of why we do not use women in the clay modeling? We took what the employment security people gave us. I would say that women might have this capability. We have a design leader who is a woman, and she is outstanding. I think this will become more prevalent as time goes on, especially with the laws as they are.

Dr. Davie:

What about the effect of declining auto sales on your training programs?

Mr. Landis:

This has had some temporary effect. We have had the problem of not being able to get the people. As far as the mobile training unit, we have had some difficulty in getting some of the people out to the classes because they were badly needed on the job. In some instances, we have paid time and a half to get people to go to the units. So when you have economies on, time and a half goes out the window. We hope this is temporary.

Dr. Fishman:

I would like you to tell us a little about how you predict the kind of training programs you should start planning for now. Obviously, when the shoe pinches, such as the modeling, or the power seamstresses classes, you have an immediate shortage to meet. How do you think in terms of longer run training?

Mr. Landis:

I will be brutally honest with you. I would not wish to discuss this at this time--because this is 1967.

Mr. Kotz:

I would assume, not talking specifically in terms of a year as troublesome as 1967, that in terms of forecasts of sales in the auto industry, you do have a regular system by which you look at your manpower needs in the future.

Mr. Landis:

We are going to try to get complete capability in our work force, in our planning, training, etc. We believe strongly in the upgrading and updating of our present work force. We do not like to superimpose people coming into the company over those we already have. We believe strongly in promotion from within. We have regular projections. The contract we signed in 1964 in the area of early retirement is an example. Early retirement did not make the inroads that were anticipated. This, again, was due to high earnings and large sales. But I am of the opinion that if you have slight dips in the economy, as we have had recently, this would be accelerated since overtime hours are lessened. We have a five-year plan and annually we make adjustments and add on.

Mr. Kotz:

How specific do you get in looking at your manpower requirements?

Mr. Landis

We get down to all the details, and naturally the basic directive that a given area has. In our area, for example, it is our responsibility to do this projection and work with the employment people in developing these projections. We have a series of conferences, such as the one here, and each person projects, from his standpoint, what his problems are. You try to come up with some realistic general approaches.

Dr. Fishman:

Then, you are interacting with the vocational education people in Detroit?

Mr. Landis:

This is a point I would strongly make, and I criticize industry for not being more aggressive in our approaches in working with vocational people. On the other hand, I criticize vocational people for not being more aggressive and making us work with them. I think we are both to blame.

Mr. Kotz:

When you talk about vocational people in this way, you are including the vocational educators in the public schools, employment security people, and MDTA people, as well?

Mr. Landis:

I think we all ought to take a good look at ourselves and work more closely together.

Mr. Righthand:

In the total picture of jobs, are there jobs in your industry that require no formal training?

Mr. Landis:

A great majority of the jobs require no formal training.

Mr. Righthand:

I am asking this because there is some statistic that states that only three out of ten have formal training. I do not question this statistic. I was concerned with the implication that all of the other seven must have formal training.

Mr. Landis:

They would come in to entry-level jobs in the automotive industry and, in the meantime, we would have been upgrading the people already in those jobs, to open up spaces for them.

Mr. Kotz:

However, you are suggesting giving that hard-core group some formal training. If they require no formal training, then what does this formal training consist of?

Mr. Landis:

They would get the basic education before they come in. Once they come in, they get on the ladder the same as anybody else. If they have the qualifications, they can get into the upgrading system.

Mr. Kotz:

What I wanted to focus on is that although they would be trained for the world of work, it is really the type of training the general educators would provide in the elementary, and perhaps the secondary school level.

Mr. Landis:

My only point is that we think we have a better opportunity of doing the on-the-job training because of the environmental structure and the specific equipment, methods, and procedures we have available, that are not available in a formalized educational system.

Mr. Medvin:

Mr. Landis, how do you think your company would do with a request, say from the Bureau of Employment Security or any other government agency, once every two or three years, to provide them with a list of the occupational employment in all of your establishments, broken down by the relatively detailed occupation and employment in each? How do you think your company would view such a request?

Mr. Landis:

What are you asking for beyond what we have to give you already?

Mr. Medvin:

We have never requested any occupational data from you for your total plant. On occasion, in Detroit or elsewhere, we may have attempted to make an area skill survey. When the Census comes through, it gets the data from your employees at home. What do you have in mind when you say you give this to us?

Mr. Landis:

I am quite sure that through our Employment Division we supply the BES with a comprehensive report. I am not in that area, but I am sure it is at least annually and it may be more frequent than that.

Mr. Medvin:

I am talking now about a count by detailed occupational classification of employment in all of the Chrysler plants. You say once a year, fine, I think that would be wonderful but you say the company provides this?

Mr. Landis:

I think this is a regular report that the BES gets every year of the complete employment breakdown.

Mr. Medvin:

Do you make such adjustment for technological change even within your own shop when you are projecting manpower requirements?

Mr. Kotz:

This has been a very valuable exchange. There is one area that Lawrence Thomas raised that may be useful to return to; his comment on "cut flowers." To what extent are we missing something when we divorce the intellectual development and absorption of knowledge from actual work processes? I gather that once you get a man into your program he begins to get the skills and rewards, he becomes highly motivated, and he stays with his job a long time. He has the necessary prestige and other status satisfactions that go with a highly motivated individual. Is there something to be learned here from what we have heard about the combination of learning and doing in a work environment that contributes to achieving several societal objectives more effectively? Is there some other failure of society generally in this area that we are missing?

Dr. Thomas:

From what I have heard, it sounds to me that vocational education has the natural condition for a very good kind of education, but I do not see enough signs that it takes any responsibility for intellectual development in the setting of vocational training itself; whereas academic education makes the claim but does not have a good setting for developing vocational growth.

Mr. Kotz:

What do you see as the catalyst to bring this together? It appears to me a sort of dichotomy that has to be bridged.

Dr. Thomas:

I would like to start with vocational education because it has such good, natural circumstances. We have the roots of the plant.

Mr. Medvin:

We are well equipped with university professors and doctors, and it is also a rare treat to have an industry man. I would like to ask Mr. Landis one further question. One of the techniques that the forecasters in the manpower field are most enamored with at this moment is the technique of projecting an industry trend and then applying typical second pattern for an industry, and thereby arriving at an occupational breakdown and ultimate needs of the area or geographical unit by occupation. Are there differences enough in the staffing patterns between, say Chrysler and GM, so that you could apply such an average staffing pattern that someone might devise for the nation as a whole and for the automobile industry and apply it, say to Detroit, five years hence? They would assume that automobile employment would increase 10 percent, and therefore they would simply take that new figure of a 10 percent increase and simply superimpose on it the occupational staffing pattern. Do you think that is a viable method of coming up with occupational needs?

Mr. Landis:

That is basically the way it would be done.

Mr. Medvin:

Do you think that this departure in Detroit from the national pattern would not be serious enough to limit the interpretation and needs of the Detroit area?

Mr. Landis:

As to the industry as a whole, there would be this possibility. The relationship of jobs in the automotive business from one company to another is quite close. We have a problem in the automotive industry because the majority of jobs are menial production jobs, and how you work out the status as far as a job relationship is concerned is pretty difficult. The automobile employee gets his satisfactions in other directions. He has an inherent desire to do a good job. How, in a mass production field, do you go about creating a feeling of attainment and interest? We attempt to give basic instructions in ordinary economics. One used rather effectively is similar to a cartoon book. We use that same method to explain our balance sheets. A lot of people have the idea that we make 75 percent on our investment.

I have a copy of a report from the Great Lakes Steel Corporation and its permission to pass it out. I have a copy of the corporation's entrance exam, which is given to all employees. As you know, in the steel industry, they have a lot of measuring to do because you have to measure steel. There are 12 questions in this test. The first question, for example, is: "If you had a pocket full of nickels which amounted to $2.65, how many nickels would you have?" Or, "What would you pay for a pair of shoes costing $10, with a discount of 10 percent, plus a 4 percent sales tax on the discounted price?" The applicants had to get 50 percent correct. The applicants are high school graduates from the Detroit area. I have the statistics from 1961 through November 5, 1964. Out of the group, 827 passed and 1,244 failed. In the period from April 20, 1964, to November 5, 1964, 1,480 passed and 2,554 failed. What the corporation did was to go to the local high schools and have them devise a test similar to the one I have here, and give it to all students in the 11th grade. The students who did not pass were given remedial training in their senior year, since this is 7th grade arithmetic. In the schools doing this, 87 percent of the applicants passed the entrance exam.

Mr. Kotz

If it were given to 7th grade students, it would have a different significance than if it were given to high school graduates.

Mr. Landis:

This is the point I am making. This test, administered by the Employment Security Commission, actually asks questions relevant to the knowledge they must have to do the job. There is some relationship between what you learn in the 7th grade and what you have forgotten when you get to the third year of high school.

Chapter 10

IMPROVED PLANNING FOR VOCATIONAL AND TECHNICAL EDUCATION: A STATE DIRECTOR'S PERSPECTIVE

by
Robert M. Worthington

Background

The purpose of this presentation is to discuss some of the practical problems confronted by a State Director of Vocational Education and how steps have been taken to develop a system of planning for a total program of vocational-technical education. It is also intended to identify needed assistance that can be provided by the research community, the federal government, and other agencies. It must be kept in mind that the State Director must make many program decisions that are based on subjective judgment rather than valid research. Even a system of long range planning is based on a series of compromises. The State Director's position is an extremely "lonely" one because regardless of the procedures that he has followed in determining the goals for the state's program of vocational-technical education, in the immediate or long range future, the ultimate decision must be made by him. After examining all the alternatives and establishing priorities, real decision-making rests with him or a few individuals. It is doubtful that a master plan has ever been developed or will be developed in the future that can provide all possible alternatives.

In New Jersey, we have involved during the past two years a large number of knowledgeable leaders in business, industry, organized labor, and education in establishing goals for vocational education. The first step in this direction was a blue ribbon committee of leading citizens who, shortly after President Kennedy's panel of consultants reported on their national study of vocational education, made a study of our state's needs. This committee's report, entitled "Needs of Vocational Education in New Jersey Today," showed that fewer than 3 percent of students in the 15 to 19 age bracket were enrolled in vocational education programs. The supporting evidence provided by this committee report indicated a need for a massive expansion of vocational education in New Jersey.

It showed that of the 304,617 pupils enrolled in New Jersey public secondary schools in 1960-63, fewer than 10,000 were enrolled in federally reimbursed vocational-technical programs and that education was not available in enough schools and not available to all who needed it. The committee recommended that New Jersey vocational education must:

1. Offer training opportunities to the 60% of New Jersey youth who do not go to college.

2. Expand vocational-technical training programs consistent with employment possibilities and New Jersey's economic needs.

3. Provide programs with a solid occupational foundation, built on a knowledge of present job opportunities and projected future needs.

4. Make training opportunities equally available to all regardless of race, sex, or place of residence.

It was projected that the need for skilled workers in the state's more than 14,000 industrial plants would triple over the next decade and the need for semiskilled workers would double.

Using the recommendations of this committee as our plan of action, steps were taken to implement this massive effort. In less than two years, the state vocational leadership staff grew from 12 to 56 professionals. The percentage of students being served grew from 3 percent to 21 percent. It is expected that within five years, this percentage of youth to whom vocational education is available will reach 60 percent.

Effective programs of vocational education and training are being provided in comprehensive high schools, specialized area schools, skill centers, technical institutes, community colleges, private trade and technical schools, private business and correspondence schools, and industrial plants. Industry has eagerly assisted in cooperative vocational education that provides school and work experience for high school students in more than 4,000 New Jersey companies, training students in more than 130 different job classifications.

The support of the public, especially the business and industrial community, is essential to a strong program of vocational-technical education. The New Jersey Vocational Education Advisory Council, composed of 15 leaders of organized labor, management, and education, has been a most active and potent force. Without this kind of support, the most sophisticated system of PPB would be of little value.

The next involvement of large groups of leaders in the state in planning vocational education occurred in April 1966 when Gov. Richard J. Hughes called a Governor's Conference on Education. Vocational education was one of the nine major topics of concern discussed by more than 2,000 citizens. This group provided five recommendations that will be of special importance to us in our long range planning:

1. Vocational education should be extended from the elementary school to the 14th grade to meet present and future employment needs.

2. High schools should provide preoccupational training. New Jersey's area vocational schools should be redefined as postsecondary technical institutes or community colleges and receive a much greater input of state aid.

3. Efforts should be made to acquaint young people with the world of work. Vocational counseling should be provided from kindergarten through grade 14. A state-supported computerized employment plan should be introduced in the middle school years.

4. Plans should be made for curriculum coordination at the state level. The interrelationship between various disciplines should be the determining factor in state-adopted curriculum decisions.

5. Work-study programs should be made available to young men and women who are unable to enter postsecondary educational institutions.

Further involvement of leading citizens occurred on October 6, 1966, when a Governor's Symposium on Education and Training for Employment was held. This Symposium, which was a brainchild of the New Jersey Vocational Education Advisory Council, was called for the purpose of increasing cooperation among agencies involved in employment training in New Jersey. The following observations on planning appear in the report of this Symposium:

I. There is need for long range planning:

    A. This could be done by an existing agency but it might best be accomplished by a special council of interested agencies and organizations. This council should be established by the Governor.

    B. The long range plan should be disseminated widely to serve as a guideline to all agencies and organizations providing or planning education and training for employment.

    C. Periodically, the long range plan should be reviewed, evaluated, and revised, if necessary.

II. There is need for special action to accumulate, analyze, and disseminate useful information on the needs of the people, the needs of employers, and current educational and training programs.

    A. This information should be made available not only to the long range planning committee, but to all interested agencies and organizations.

As Symposium Chairman, in a final closing summary, I stated that a consensus had been reached on several important issues facing New Jersey in education and training for employment:

1. That coordination and cooperative action is necessary, desirable, and possible.
2. That no one agency, institution, or group can do the necessary job alone.
3. That vocational education experiences should begin early in every child's formal school years.
4. That programs must be further expanded and developed for the disadvantaged, the unemployed, and the underemployed.
5. That a system of master planning for development of a total program of vocational, technical, and occupational education is badly needed.
6. That much closer cooperation between industry and education must be developed.
7. That research must be the basis for program development.
8. That the needs of people must determine our goals and not the vested interest of any single group or agency.
9. That a massive public information effort is needed.
10. That the concept of education and training for employment should be a vital part of every person's education.

These ten points, it seems to me, must be considered as the fundamental basis for long range planning in New Jersey. It is also apparent to me that a master plan that would not take into consideration the recommendations of the abovementioned conferences would have little or no chance of being implemented.

Planning by State Departments of Education

The element of planning has traditionally been a vital part of the operations of state departments of education. Any institution or organization, public or private, responsible for the allocation of financial resources has in one form or another developed plans that, in its best judgment, result in the highest return for its investment. The degree to which this planning in state departments is operational or in depth varies from state to state and is conditioned by environments external to the agency.

Planning is conditioned by budgetary procedures. All planning is ultimately reflected in a budget. Differences exist between states with annual and biennial budgets. These differences also exist according to procedures employed in budget preparation.

The current shift in emphasis at the federal level, from the traditional system of budgeting to the PPB system will change planning procedure, and obviously, directly affect us at the state level. It is too early to evaluate this new concept effectively as it applies to vocational education, but I believe it is valid to say that it will condition planning.

Improved planning has meant a shift in emphasis in the concept of planning. We are now becoming more sophisticated in developing techniques and alloting time to this function in state departments. Planning is moving from short term to long range, in a sense from "what can we do" to "what needs to be done."

In developing a format for producing a Master Plan for a Total Program of Vocational-Technical Education in New Jersey to 1980, our Director of Program Planning made a thorough study of what other states or regions are doing about long range planning of vocational education. Unfortunately, very little has been done in this field. New York State's Vocational Division uses an operational system that has been developed within the Department of Education. A six-member planning committee is responsible for recommending the allocation of the vocational budget. Briefly, this committee is charged with identifying the program needs that exist in the state. The staff provides current information that is analyzed and compared with historical data. A list of programs is compiled, and a priority system is established. Funds are distributed on the basis of this priority system.

Michigan developed a master plan for vocational education over a five-year period in conjunction with the State Department of Labor. It uses a contractual arrangement to achieve its goal. Needed research was identified, and contracts were made with universities in the state and private organizations to conduct the studies. The results of these studies were disseminated in the state, and the state is in the process of implementing the recommendations. Other than the previously mentioned states, little has been done in the field of vocational education to develop long range plans on a systematic basis.

In New Jersey, we are currently working to develop a master plan for a total program of vocational-technical education that we believe is unique. Recognizing that product and process are equally important to achieve implementation, we are attempting to involve people in the planning process. Under the direction of the Division of Vocational Education, a statewide workshop for 125 people representative of education, business, government, and labor was held to determine the components for a Master Plan. As a result of this conference, nine areas were identified for intensive study: Philosophy, Research and Evaluation, Curriculum and

Programs, Facilities, Finance, Guidance, Teacher Needs, Leadership Development, and Public Information. It was recommended that a committee be formed to develop the philosophy and overall statements of objectives as the first step. This committee has now completed its work and will present its statement to the executive committee at its next meeting. This executive committee, headed by the State Director of Vocational Education, is composed of the nine area study committee chairmen and our Director of Program Planning. The executive committee will attempt to guide the area study committees using the accepted statement of philosophy of objectives so that effective evaluation can be accomplished.

Evaluation

The Division of Vocational Education has recognized the importance of developing procedures for evaluating, on a long range, continuous basis, its total program of occupational education and training. The evaluative procedures would have to take cognizance of how existing resources, personnel, facilities, and finances are used to the best advantage of both society and the needs of the individual whether he be young or old or in need of entry-level training or retraining to meet new labor market demands. Because of the importance attached to evaluation, the Division of Vocational Education volunteered to take part as a cooperating pilot state in a research project, sponsored by the Ohio State University Center for Research in Vocational-Technical Education, designed to develop a model for evaluating state programs of vocational education.

It is anticipated that the model will be developed in a manner consistent with the latest coordinated reporting systems developed by the U.S. Office of Education and will permit the use of EDP techniques for rapidly integrating information required for administrative decisions.

The Division of Vocational Education has recognized the need for adopting and implementing new concepts and instructional innovations in occupational education by funding more than 350 pilot projects this year in school systems throughout the state. These projects will soon be re-evaluated to determine their adequacy in providing students with salable skills. On the basis of these evaluations, Division personnel can be better equipped to assist local schools in their subsequent efforts. The evaluative efforts are an extension and partial revision of the procedures used during the spring of 1966.

At that time, with the aid of local school district personnel involved in these pilot projects, a committee comprising program specialists from the Vocational Division and resource people from other disciplines developed an assessment guide. The assessment criteria enabled the local districts and Division staff members to determine whether the elements that constituted the local programs were occupational in nature and were indeed preparing youth for entry into the labor market with a minimum of difficulty. The guide also enabled the districts to recognize many of the strengths and weaknesses of their programs, thereby leading to improved instruction facilities and desirable effects on youth.

The Guide for Developing Pilot Projects in Occupational Education was prepared by a committee under the direction of the Director of Pilot and Demonstration Programs in the Research and Development Branch of the Division of Vocational Education. To assure quality occupational skills training projects, a set of minimal standards were suggested by the County Superintendents of Schools and approved by the committee.

The committee charged with the responsibility for developing the evaluative criteria was constantly alert to the fact that criteria submitted must be attainable. It was the committee's belief that concern should be less with ideal states or intricate technical points and more with action and achievement. It was expected that the occupational education instruction would develop within the student acceptable habits of using his newly acquired skills and knowledge in seeking and maintaining satisfactory employment. To this end, each district participating in this venture was asked to submit to the committee a number of performance goals, which would indicate achievement on the part of the students and would thereby provide a measure of program process effectiveness in meeting the overall objectives. The goals provided were summarized and listed under the titles of the various areas of instruction and then further categorized by course content.

The evaluative criteria were gathered from the districts participating, from the Vocational Division specialists, and from various publications dealing with program assessment. The format established followed the pattern set by the National Study of Secondary School Evaluation.

In the spring of 1966, the Evaluative Criteria Committee developed a plan for evaluation of every one of the Pilot Projects. This plan consisted of assigning a minimum of three persons to assess each project with at least one member of the group being outside the specific occupational area. Each project supervisor in the local school district was asked to do a self-evaluation using the same assessment guide provided the evaluators.

On-site visits were made to each project, and each evaluator rated the project in terms of the overall criteria for all programs and the performance goals developed for the specific occupational area within which the project fell. Pooled judgments as to overall project effectiveness, its strengths and weaknesses, and recommendations for improving instructions were assembled, based on a composite profile of the raters.

This information was used by Divisional staff in working with the local district staffs to upgrade the quality of the projects. It should also be mentioned that a number of out-of-state consultants were invited to an orientation workshop and then assigned to accompany the assessment teams as a further check on the reliability of the judgmental procedures. These consultants also submitted written comments concerning the effectiveness of each project visited in terms of its goals in providing occupational education.

All the raters were oriented to the basic purpose of the evaluation conducted to:

1. Upgrade instruction with relation to the stated occupational and educational objectives.

2. Learn which techniques have proved effective.

3. Enable districts to recognize strengths and weaknesses.

4. Aid in redirecting objectives.

5. Aid in establishing criteria for future evaluations.

6. Assist teachers, supervisors, and administrators in self-assessment of their pilot program or programs.

7. Assist the personnel of the State Department Vocational Division in locating areas that may need specific aid toward meeting requirements of the Vocational Education Act of 1963.

Following each on-site project visit, the vocational division staff member responsible for coordinating the visit passed on the findings to the Director of Program Evaluation, who summarized the data and sent back the results to each Branch Director for use in providing further assistance to the local district.

The evaluative procedures provided both state and local staffs with a yardstick by which to gauge project effectiveness and served as an aid in determining which existing and newly applied-for projects should be funded or upgraded. In addition, the on-site visits pointed up the necessity for scheduling conferences with local administrative and teaching personnel to orient them better to the goals and mechanics of pilot and demonstration projects. It is anticipated that the present system for evaluating these pilot projects will eventually be incorporated as part of the Vocational Division's total program evaluation system. It is anticipated that long term evaluation will serve as one important tool toward the goal of meeting New Jersey's vocational education needs.

Although cost per student in pilot occupational programs is generally expected to be higher than for normal programs, an analysis of the cost of our 1965-66 school year pilot projects indicated a cost per student of only $203 for one full school year of occupational education. This cost was based on 7,110 students in 100 school districts enrolled for a minimum of two periods per day, five days per week for the school year. The cost represents the specific amount expended for occupational education in addition to the regular costs of general education in the school district.

We have recently funded a small evaluation project using the services of private industry. Our State Board of Education approved a contractual arrangement with the Education Division of Xerox Corporation to evaluate the effectiveness of our basic education efforts in conjunction with occupational education programs for disadvantaged youths. There will no doubt be many other benefits from working with private industry or agencies outside the educational establishment, but the most significant to us is the assurance of unbiased judgment. We firmly believe in objective evaluation and that the most important outcome of evaluation is improvement of the quality of vocational education.

Needed Assistance From the Research Community, Federal Government, and Other Agencies

Although a great deal of progress has been made in expanding the staff of the State Department of Education to provide the management and research capabilities needed, considerable help is needed at the state level from many sources.

1. The federal government should increase its contribution to upgrading of state departments of education as has been attempted under Title V of the Elementary and Secondary Education Act. Massive grants should be made available to the state departments of education for planning that will permit a great deal of flexibility and interchange of personnel between public and private state and federal as well as local agencies.
2. An effective model for master planning in vocational-technical education should be developed, tested, and implemented immediately. Although a start has been made in this direction, action is entirely too slow. In our own case in New Jersey, we are developing a Master Plan for a Total Program of Vocational Education to 1980 with the full realization that the class of 1980 will be in kindergarten next fall.
3. The research community should devote much more of its attention to the accumulation, analysis, and dissemination of accurate and useful information on the educational and training needs of employers and employees. For long range planning for vocational-technical education to be of any value, such information is essential.

4. The research community should continue to apply its efforts toward application of the systems approach to vocational-technical education. The research community, in cooperation with the federal government and other agencies, should assist state vocational agencies to maintain an up-to-date inventory of the work force and a description of the talent needed for the work force.

5. State divisions of vocational education need assistance in developing analytical approaches to planning for budgetary purposes.

6. There is a great need in state divisions of vocational education for assistance in planning and implementing cost/effectiveness studies that consider the needs of people and that will provide the basis for establishing priorities for program expansion and facilities construction.

7. The U.S. Office of Education should make information needs available to states in terms of projected planning and budgeting.

8. Evaluations should be an integral part of all vocational education programs.

9. The federal government should provide additional funds for follow-up studies of vocational education graduates.

10. Exchange programs should be initiated with state departments to allow PPB system specialists to work in state departments and vice versa.

11. The federal government should emphasize its leadership role rather than its regulatory role in vocational-technical education.

Discussion

Mr. Tuma:

I was particularly impressed by the fact that New Jersey has moved from roughly an enrollment of 3 percent of the student body in the 15 to 19 age bracket in vocational education in 1953 to a figure of roughly 20 to 24 percent today. Is this the result of careful planning or a response to a number of forces in the environment that contribute to the growing popularity of vocational education? The enthusiasm that has been generated in broad recognition of the problem of unemployment and the necessity for better equipping people for the world of work to help solve it are part of these forces. This movement from 3 percent to 24 percent must have been in part a result of the broad objectives that were stated, some of the more specific goals, and certainly community-based support.

We have no report on the participation of adults with regard to the vocational offerings that are made available by the state in New Jersey. This is one aspect that we should hear about, with regard to participation of adults in posthigh school training and the vocational offerings that are made available. Relationship between the area schools and the community colleges that were a factor in the New Jersey educational system are matters that are not peculiar to New Jersey, but this may take on different colorations and different characteristics in each of the states.

Dr. Worthington remarked that the decision-making process really rests with a few individuals. This decision-making process, I would assume, however, would not be effectively implemented without a broad base of public support. Here we are talking about a basically political problem, and by that I do not mean a partisan problem, but a political problem in terms of reshaping and recasting the thinking of people so that we can readjust institutions from one frame of reference to another. This, indeed, requires a considerable amount of leadership and expertise, and to do this effectively, I expect that the two initial conferences that were mentioned must have had an extraordinary effect.

There is some reference made to the master plan and goals, but I felt an absence here of goals that are related specifically to the kind of targets or overall objectives you desire to attain. It was noted that there were 130 occupations now being offered in cooperative vocational education. The emphasis is not necessarily on the skilled trades or the apprenticeable occupations but on a broad range of occupations that lead to employment. What methodology or emphasis was applied by either the decision-making people or by the advisory committees in determining what occupations should be offered for training is not clear, whether these 130 are really representative of the emerging occupations, those for which there is current and prospective demand, those selected empirically, those selected as the result of political pressures or employer or student pressures. Were certain offerings excluded because of concern or pressure on the part of joint apprenticeship committees or management or labor? Were some included that represented low wage occupations that are generally not easy to fill simply for that reason? Were devices developed such as forecasting job demand for either short or long term time frames to help the decision-makers? These are things I am sure would be of interest to us.

I think we can say in Michigan that there is a modest effort being made but only to the extent that there can be a detection of declining or emerging occupations so that a curriculum can be adjusted. On the question of curriculum, the extent to which the state staff is involved in readjusting curriculum to meet these 130 occupations is also a point of considerable interest. I know that the experience we have had in Michigan is to find ways to short circuit long range vocational education plans to meet MDTA requirements so that employment is a reasonable expectation after 15, 25, 36, or up to 48 weeks. This has required the experience and cooperation of vocational educators to make a rather massive effort in adjusting curriculum content. In New Jersey, as it has moved into various occupational areas for training, the extent to which curriculum adjustment has been a factor and the sources of support and strength for instituting such changes would be of real concern to the universities, the vocational education departments, or the state departments of education. Or is this left primarily up to the local school systems? This seems to me to be a very important factor; how such change is managed, how political the support is that is attained for it, and whether there is an adequate interchange of information as they relate the curriculum to ongoing course offerings in each of the school situations.

Beyond that, are we finding in the New Jersey situation that there is an effort made specifically to zero in on occupational training that goes beyond the traditional skill preparations with results that lead to employment in occupational clusters for which there is real demand currently and in the future or is the training really preparation for employment and the imparting of effective work habits so the people can be employed? To what extent are the people actually receiving employment in industries or jobs or related occupations for which they were trained? Yesterday, Dr. Arnold indicated that his background in vocational education really did not prepare him for his present position. Dr. Mangum indicated that as a coal miner and aircraft mechanic he wound up in somewhat of a different occupation than his initial preparation, and I suppose that if we went around the room we would find most of us had come to our present occupations through a rather circuitous way. How important is it to prepare people for a specific job as contrasted to general preparation for employment? Is one type of training program better than another for their employment retention or upgrading from the entry level base and is there enough experience in the New Jersey situation to suggest approaches or directions at the present time? Do we have enough experience anywhere to come to a basic decision?

I think one of the most impressive things that Dr. Worthington mentioned New Jersey is doing is that it is adding a 13th and 14th year technical institute program to the offerings for those who are occupationally bound rather than bound for baccalaureate degrees. Perhaps, this will be an effective means of designing specific occupational training for work stations that will pay higher rewards for more specialized and intensive training.

When the subject of apprenticeship was mentioned by Dr. Worthington, I was interested in the fact that New Jersey has over 6,000 apprentices enrolled. This gets to the point of whether apprenticeship is really an archaic institution or whether it is playing a vital and valuable role in American industry, or whether it is a little of both. The fact that there are 6,000 enrolled in New Jersey is not meaningful unless we could determine the number of people who are needed in the trades and the number of people who are entering the trades through some route other than formal apprenticeship. In certain areas of the country, I think we will find almost 90 percent of those who enter what are known as formal trades coming in via the side door or the back door, and in other situations, particularly other distinguishable trades, the number may not run any higher than 10 percent. But does the 6,000 figure and the emphasis on the apprenticeship really represent a meaningful contribution or are we actually finding that through the 13th or 14th year, through the community colleges or through associate degrees, people are being sufficiently prepared so that apprenticeship can be short-circuited or at least reduced in terms of the number of hours that are necessary for an apprentice to qualify for journeyman status. Are conventional apprentice training programs too long in terms of imparting skills and knowledge that should be acquired by the students? If so, a waste of student and society's time and money is involved.

I do not think this is a question of competency with regard to trade performance. I would not want to suggest that we water down the capabilities of the trade requirements but rather that we search for other state plans, devices, and means to produce larger numbers of apprentices in a quicker or shorter period of time, and at the same time meet more effectively the problem of artificial barriers that are raised to employment. Is there some evidence that the New Jersey approach, or other state approaches, may employ the 13th or 14th year as a means of accelerating entrance into trades and at the same time provide the competencies that are necessary? If so, institutional changes are required such as the job of confronting joint apprenticeship committees and persuading them that there is need for adjustment in their own standards. It goes back to an original thesis of mine that the formal apprenticeship program is designed in part for training and in part for control of the labor market, and I am not sure it is doing a good job in either respect. It is rather doubtful that the training is open to all people desiring to enter the trade, and it is questionable if the control of the labor market is a socially desirable thing.

We all recognize the point that Dr. Worthington made about the need for improved guidance and counseling. There are opposing points of view that counselors and guidance officers have a function only to the point that the child feels it is necessary to receive some help. Others have a feeling that there ought to be a strong right-arm available to the student because of the extraordinary number of new, emerging occupations coming in, the changing emphasis and the [illegible] in how deeply New Jersey has been able to penetrate into the operating level of the schools so that guidance and counseling reaches all the kids, and then how it is handled. Is it done through the child, is it formalized, or is it part of what one could call a coach system, where the guidance official stays with the student on a continuing basis, whether in a rather obscure way but nonetheless on a continuing basis? This is an area that I really believe is going to be expanding and enlarging because it is an extremely confusing world to a young person. Just as an aside, let me say that I was at Rutgers here not too long ago joining a panel and one of the more distinguished manpower experts in the United States made the general observation that by 1975, 50 percent of all the occupations that will exist are those that we do not have titles for today, and I came home and was explaining this to my 19-year old son, who is beseiged with the same problems of decision that 99 percent of the kids are in this country. He said, "Why don't you get off my back then, if the experts don't know what the jobs are, how do you expect me to know?" This is an extremely important thing and has to be handled in a most careful way so that we don't try to play God with children, but at the same time, open up their eyes effectively in order to make realistic choices available to them.

I finally want to comment on one other area that has been noted by Dr. Worthington in his report. This is the terms and conditions under which private schools operate in the state of New Jersey. I do not have a complete and thorough knowledge of state legislation across the country, except to say that private schools are generally licensed but the terms of their licensing may be only a pro forma act, or there may be certain specified criteria and standards that have to be achieved. This will vary from state to state. I was appalled in Michigan at the absence of legislation in this respect. Anyone can start a private school and hang out a sign. The licensing rests only on the safety factors, on the fire marshall or on the police in the community, and beyond that there is no real legislative or statutory authority vested in the state department of education or the vocational education division to insure quality in the private school. Private schools are playing an increasing role. I think the legislation that was passed in 1964 or 1965 encouraged the use of private schools in MDTA. If we encourage their use, and as we seek competitive stimulation from private schools, are we, in fact, receiving, or making available to students quality instruction in private schools, and how do we control this?

I have addressed myself to some of the things that have been raised in the presentation by Dr. Worthington. They raise conceptual and operating problems that I think are very important.

Mr. Kotz:

Thank you, Mr. Tuma. We will give Dr. Worthington a chance to respond. I had thought the panel of consultants had made a real contribution when they emphasized in the report the changing nature of the world of work, but there seems to be a lot of myth developing about the rate of that change. There is a necessity to have factual information to support assertions about percentages and rate of change so that we know what the facts are upon which to base decisions and develop plans and programs. The thought of a 50 or 65 percent change in the kind of jobs and job titles in a short period of time, the way change takes place, seems just a wild-eyed assertion. I know of no support for that statistic, and I hope some of our friends from the Department of Labor who do have some facts on this can indicate how close or how far that particular statement is from the actuality.

Mr. Swerdloff:

I do think that the quoted statement is very similar to one that people make who go around the country saying that 10 percent or five percent of the people will be able to do all the work in the next 20 years. This is about equal in truth, I believe, with the quote about 50 percent of the jobs changing in nature in a short period of time. I think it is a real disservice to the youth to go around making statements like that. In terms of job titles you might be right, but in terms of the places where people work, it is nonsense. When they were talking about 50 percent; more than that percent are teachers and policemen, and others in occupations that continue to increase in number over the years.

Mr. Tuma:

I was just transmitting information from a person who enjoys some reputation.

Mr. Medvin:

I have some figures that bear on this. People who are responsible for the publication of occupational titles have said that of the approximately 20,000 titles in the new, current edition of the dictionary, 6,000 are new to the dictionary but we want to make very, very clear that these are not 6,000 new jobs. Many of them were titles that they knew existed when they did the second edition of the dictionary. Therefore, while they offer no more concrete evidence or better qualification of the figures, one can only assume that the new occupations in this vast period of expansion is something considerably less than 6,000 in terms of new titles, new jobs out of a total of 20,000. The second edition was published in 1949. The new one, therefore, covers the scope of time in which we have one of the greatest technical expansions in this country, 1949 to 1966.

Mr. Swerdloff:

But you are only talking about titles, not jobs, not places where people work.

Mr. Medvin:

I am just adding another dimension to this discussion.

Mr. Righthand:

To deal with the question of apprenticeship that Mr. Tuma raised, content is changing. The joint apprenticeship councils in Connecticut are organized locally and consist of representatives from labor, manufacturing, or contractors and the school authorities. In the building trade areas, apprenticeship is very important. We do not set the standards; the Department of Labor does, whether it is a three- or four-year apprenticeship. The question is raised: Why can't the Department do the same thing on a community college and technical institute level? I cannot see that there would be any advantage. If one of our graduates from carpentry goes into his field with two years apprenticeship training to begin with, he has two more years before he can become a journeyman. I do not think any formal education of any length will make up for the two years on the job where the tempo of work is different. There would be no advantage except to keep him out of the labor market.

Mr. Kotz:

In terms of approaches to occupational education, should we consider that we are only concerned with occupational education conducted under the jurisdiction of public school systems, as contrasted with on-the-job training in industry, for example, or proprietary schools, or should we consider that we are concerned with the training of individuals no matter what system or pipeline of training is used, whether it is the proprietary schools or on-the-job training or other?

Dr. Rosen:

My philosophy, based on what we are learning through research at Labor, is that I am willing to use any means of training or any facilities that are available. At this point, we do not know which is the best way. Our studies are beginning to show that people use every technique to pick up training. They will use correspondence schools, vocational schools, technical institutes, junior colleges, military training.

In the Department of Labor, we take the approach that apprenticeship is here to stay as an institution. On this basis, we have given money to Purdue University to perform research on how apprenticeship can be improved. One of the earliest results of the Purdue study shows that we should start thinking about organized feedback of changing technology to those who train and to those who learn. This is now performed in an absolutely unsystematic manner in our society. People manufacture new products but they never think about what is the best way to introduce them to the craftsmen who use the products or the teachers who train the craftsmen.

The Northeastern research project being sponsored by the Department of Labor is quite a different study. This project is based on the philosophy that we do not know which way is the best technique for training. The Northeastern researchers are looking for the best methods and ways of training one group of craftsmen--the tool and die makers.

A third research project sponsored by the Department of Labor has just been completed by Professor Ray Marshall. Dr. Marshall and his colleague, Dr. Briggs, have taken a careful, sober look at the extent of discrimination against Negroes in the apprenticeship field. The researchers have tried to identify methods and techniques of discrimination and have made recommendations on how to overcome discrimination.

Dr. Worthington:

It should be pointed out that the 1962-63 study, "Vocational Education for New Jersey Today," reported that fewer than 10,000 young people in the 15 to 19 age bracket were enrolled. At the same time, 38,000 adults were enrolled. New Jersey has always placed more emphasis on posthigh school and adult vocational education than on secondary vocational education. The committee that prepared the report felt that every high school had the obligation of making occupational education available.

Another significant point of this study is that at the end of the 1962-63 school year in our state, the report showed that there were 70,000 young people in the 16 to 21 age bracket who were neither in school nor working, while at the same time the Department of Labor in New Jersey said there were more than 80,000 unfilled jobs. These youths were obviously not employable, at least the great majority of them had no salable skills. Reference was made to the 4,000 industrial plants involved in cooperative vocational education. I think some of you might have misinterpreted my statement there. I mentioned we had 130 different occupational titles now in cooperative vocational education training in 4,000 plants and business establishments. There are other occupational programs involving more than 130 occupational titles. As far as the adjustment in our curriculum, we have an excellent state vocational-technical curriculum laboratory that has been in operation for about 10 years. It is located at Rutgers University and financed 100 percent by state and federal vocational funds. Last summer, we selected more than 60 teachers and leadership personnel from vocational-technical education throughout the state of New Jersey who were brought to the Center for a full four-week period, eight hours a day, to develop and upgrade specific curriculum, under the direction of curriculum specialists. Next summer, we expect about 100 participants. We are financing these people--giving them stipends so they can concentrate during the summer on developing the cirriculum. Several other states are also working on such constant curriculum upgrading.

We are also rapidly developing programs of training for clusters of occupations. The brochure "Developing Human Resources in New Jersey" describes an example of the cluster approach in visual communications technology. The students enrolled in this at the New Jersey School of the Deaf are part of a pilot project in visual communications technology. They are involved with everything from design to cartography. We are not just training people to run linotype machines or do varityping; they are getting a broad spectrum of occupational competency. Every student in this school has to become employable despite his handicaps. The only other technology program in the country for the deaf other than this is the college here in Washington (Gallaudet).

Another example of the cluster approach we are using is in fluid power. Fluid power technology that we are experimenting with in New Jersey covers many different occupational competencies such as welding, electronics, hydraulics, and pneumatics, as well as broad skills in the machine shop field. Also under way is the nation's first vocational program training people to be mechanics for packing machinery. This industry in New Jersey asked our Elizabeth Vocational School to set up a program to train people to work in the packaging industry. The industry gave the School an outright grant of over $100,000 worth of equipment and provided specialists to help develop the course. This is now beginning in Los Angeles and Chicago. These are some examples of approaches to training for clusters of occupations.

We have had in New Jersey area vocational schools since the County Vocational School Law of 1913, which provides a broad tax base across municipalities and across school district lines. Our Middlesex County Vocational School did a follow-up study in 1964. They traced the graduates of the class of 1955 to determine what happened to them and find out where they were employed 10 years later. For the class of 1955, 87 percent were placed in occupations for which they were trained. Ten years later, in Middlesex County (the New Brunswick area) 70 percent of those people were still in Middlesex County, still working in occupations related to their training.

As far as the 13th and 14th years are concerned, we are just now developing in New Jersey a system of community colleges. We have not been very progressive in higher education. Our first four public community colleges opened their doors September 1, and we have hired nine additional presidents. These are set up on a countywide basis so conceivably we might have 21 county colleges within the next five to ten years.

There are several things we need to look at in occupational education at the college level. College professors have different salary levels, different teaching modes, and different competencies as far as occupations. If we are talking about turning out skilled technicians who are really competent in their occupations and about keeping the cost of this training down, we should look at the technical institutes. We have seven vocational-technical institutes operated through our county vocational school systems.

We obviously have to look at the relationship of our area vocational schools and technical institutes to the emerging county community colleges in our master plan. Our master plan committee includes community college presidents, technical institute directors, university deans, and representatives of concerned groups. As far as the apprenticeship program is concerned, we are doing all we can to help promote the apprentice program. We are working with the unions, with management, and with civil rights groups. Many of our schools have well-planned pre-apprentice programs, such as in the skilled trades. We have two or three new programs in tool and diemaking in conjunction with the national contracts.

In the area of guidance, I mentioned briefly our experimental programs that we call Introduction to Vocations. What we are trying to do is combine the forces of guidance counselors--teachers who are knowledgeable about occupations--and representatives of business and industry who come into the schools to acquaint young people systematically with the world of work.

We fortunately have strong private school laws in New Jersey. We license all the private, trade, and technical schools. They have to meet standards of curriculum and instructional staff, and their licenses must be renewed annually. We have a very good relationship with these schools and are using many of them for referrals under the Manpower Program. We have more than 65 business and correspondence schools approved and licensed by our office and about 45 trade and technical schools. Twenty-one of these schools had MDTA students this year.

In New Jersey, we feel the MDTA program is a part of the total program of vocational education. The objectives are not so different. We have set up over the last two years, seven multioccupational skill centers. A few of these skill centers, at the request of Washington, are utilizing older surplus equipment. Several people yesterday criticized vocational schools because their equipment becomes obsolete overnight. The government feels that the equipment manufactured in 1942-45, the equipment that is now mothballed, is good enough to train MDTA students on. We recently outfitted a machine shop in Newark with $250,000 worth of World War II machine tools. They are basic machine tools that can teach the basic fundamentals. They may not be quite as streamlined and not have numerical controls, but they still offer the capability for teaching the fundamentals of machine tool operation and the skills that entry level machine tool operators need. I think that "outside experts" criticize too severely the equipment used in vocational education.

New Jersey is moving rapidly toward developing a comprehensive vocational and technical education program that we believe will far exceed the hopes and goals expressed nationally by President Kennedy's panel of consultants. With the steps our state has already taken and with our projected master plan through 1980, we expect to provide every person in New Jersey with opportunities for learning a new skill, improving old ones, and keeping ahead of the technological changes that affect the job market, the occupational needs of business and industry, and the needs of the people of our state.

Appendix A

PARTICIPANTS IN THE AIRLIE HOUSE CONFERENCE ON VOCATIONAL EDUCATION

Appendix A

PARTICIPANTS IN THE AIRLIE HOUSE CONFERENCE ON VOCATIONAL EDUCATION

Dr. Walter M. Arnold
Assistant Commissioner for Vocational and Technical Education
U.S. Office of Education

Mr. Charles R. Bowen
Manager, Program Development
IBM

Mr. David Bushnell
Director, Div. of Comprehensive and Vocational Education Research
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Mr. Mark Colburn
Research Coordinator
Office of the Deputy Asst. Secretary (Manpower Planning and Research)
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Dr. Bruce Davie
Assistant Professor of Economics
Georgetown University

Mr. Grover Durnell
Program Planning and Evaluation Officer
Bureau of Adult and Vocational Education
U.S. Office of Education

Miss Mary Ellis
Director of Field Services
American Vocational Association

Dr. Leslie Fishman
Professor of Economics
Bureau of Economic Research
University of Colorado

Dr. Thomas G. Fox
Asst. Professor of Economics
Institute for Research on Human Resources
Pennsylvania State University

Mrs. Iris Garfield
Executive Director
National Committee for Support of Public Schools

Dr. Robert N. Grosse
Deputy Asst. Secretary for Program Coordination
U.S. Department of Health, Education, and Welfare

Dr. Joe Hall
Superintendent of Schools
Dade County, Florida

Dr. Einar Hardin, Professor
School of Labor and Industrial Relations
Michigan State University

Dr. James Kelly, Asst. Professor
Teachers College
Columbia University

Dr. Louis J. Kishkunas
Asst. Superintendent for Occupational, Vocational, and Technical Education
Pittsburgh Public Schools

Mr. Arnold Kotz, Project Manager
Office of the Executive Director, Management and Social Systems
Stanford Research Institute

Mr. Wilbur E. Landis
Manager, Technical Education Department
The Chrysler Institute

Dr. Leonard Lecht
Director, National Goals Project
National Planning Association

Dr. Otto P. Legg
Div. of Adult and Vocational Research
U.S. Office of Education

Dr. Garth L. Mangum
Research Professor of Economics
George Washington University

Mr. Marc Matland
Div. of Adult and Vocational Education
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Dr. Robert L. McKee, President
Northern Virginia Technical College

Mr. Norman Medvin
Bureau of Employment Security
U.S. Department of Labor

Mr. Bernard Michael
Div. of Vocational and Technical Education
U.S. Office of Education

Mr. Alexander M. Mood
Assistant Commissioner
National Center for Educational Statistics
U.S. Office of Education

Mr. Herbert Righthand
Chief, Bureau of Vocational Services
State Dept. of Education, Connecticut

Dr. Thayne Robson
Executive Director
President's Committee on Manpower
U.S. Department of Labor

Dr. Howard Rosen
Asst. Director for Manpower Research
Manpower Administration
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Dr. Clodus Smith
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University of Maryland

Dr. Robert Spiegelman
Senior Economist
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Pennsylvania State University

Mr. Sol Swerdloff
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Dr. Lawrence Thomas
Professor of Education
Stanford University

Mr. Joseph V. Tuma
Director, Manpower Utilization Studies Division
Institute of Labor and Industrial Relations
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Mr. Howard Vincent
Office of Program Planning and Evaluation
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Mr. Bernard Yabroff
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Div. of Adult and Vocational Research
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Dr. Robert M. Worthington
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Dr. Grant Venn
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Bureau of Adult and Vocational Education
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Appendix B

STATE AND LOCAL OBJECTIVES AND GOALS FOR VOCATIONAL EDUCATION

ILLUSTRATIVE OBJECTIVES AND GUIDELINES FROM STATE PLANS OF SIX STATES

		STATE					
		A	B	C	D	E	F
1.	To give due consideration to the vocational and technical education needs of all persons of all age groups in all communities, in allocating Federal funds.	X	X	X	X	X	X
2.	To use the results of periodic evaluation of the vocational education programs in allocating Federal funds.	X	X	X	X	X	X
3.	To give consideration to the needs for maintaining, extending, and improving existing programs, and developing new programs of vocational and technical education for youth who have completed high school and who are available for full-time study in preparation for entering the labor market, in allocating Federal funds.	X	X	X	X	X	X
4.	To provide vocational education of high quality suited to the needs, abilities and interests of the students.	X	X	X	X	X	X
5.	To give consideration to vocational education for persons who have already entered the labor market and who need training or retraining to achieve stability of advancement in employment, in allocating Federal funds.		X			X	X
6.	To use at least one-third of the State's allotment for constructing and equipping area vocational education school facilities or for vocational education programs for youth who have graduated or left high school.	X	X	X	X	X	X
7.	To use at least 3 percent of the State's allotment for ancillary services and activities.	X	X	X	X	X	X
8.	To give special consideration to the need for research, demonstration and experimental programs and to vocational education innovations of state-wide significance.	X			X		
9.	To base the policies for expenditures established by action of the State Board on information received from local educational agencies, employment offices, employers and other sources.		X				
10.	To establish programs in comprehensive high schools to provide vocational education for entry employment below the skilled trade, technician or similar career fields.				X		
11.	To base allocations to vocational-technical school and technical institute operations which are operated directly by the State Board, upon the outcome of state-wide occupational studies.				X		
12.	To fit individuals for employment through vocational education programs for secondary school students.	X	X	X	X	X	X
13.	To provide vocational training and retraining for persons who have academic, socio-economic, or other handicaps that prevent them from succeeding in the regular vocational education programs.	X	X	X	X	X	X

ADDITIONAL STATE OBJECTIVES AND GUIDELINES

STATE A

1. Expansion of programs should be accompanied by a comprehensive large-scale program of research and demonstration in occupational education and related programs.
2. We are rapidly approaching the time when we will have something available for anyone and everyone who desires vocational-technical training or retraining.

STATE B

1. To ensure that every person in the state will have equal opportunity for all types of occupational education.
2. To establish a statewide system of vocational, technical and adult education districts throughout the state.
3. To provide every citizen with the training necessary to become a useful member of society by teaching him the job skills he may need, and teaching him to understand and accept the responsibilities of citizenship.
4. To provide increased investment in human capital through the medium of vocational, technical and adult education.
5. To make every attempt to keep ahead of the needs of business and industry.
6. To continue the general education of the individual to enable him to make a better contribution to the society that surrounds him.
7. To increase enrollment in basic adult education.
8. To have a successful program, the local level must play the largest role in the decision-making process.
9. To increase participation in apprenticeship programs and various on-the-job training programs.
10. To increase the extension of professional guidance service into the smaller schools.
11. To make work study programs reasonably available to youth meeting the requirements set forth in the plan.

ADDITIONAL STATE OBJECTIVES AND GUIDELINES

STATE C

1. "To provide training programs throughout the State of It is difficult to be more specific."

2. Vocational education programs for secondary school students shall have as the main objective to fit individuals for employment.

3. To develop training programs for individuals to enter certain nonfarm employment areas such as forestry, farm equipment and distribution of farm products.

4. To expand programs to aid individuals to enter occupations in the areas of: distribution, sales, real estate, finance, etc.

STATE D

1. To give basic economic information necessary for all peoples to make sound economic decisions. (for a course in Consumer Education).

2. To develop an understanding of the geography of the local and state regions in relation to the nation and the world scene. (for a course in Economic Geography).

3. To develop the ability to use the fundamental tools of geography--globes, maps, charts and diagrams. (for a course in Economic Geography).

4. To explain what is meant by the term Data Processing (for a course in Data Processing).

5. To develop a sense of responsibility for and an appreciation of the values that are important in a free society based on free enterprise and ownership of private property (for a course in Economics).

6. To prepare qualified high school students for the distributive jobs of today and the business leadership of tomorrow (for the cooperative part-time training program).

7. To raise the occupational efficiency of distributive workers through planned vocational training (for a course in Distributive Education).

8. To increase the skill, technical knowledge, occupational information, understanding, appreciation, and judgment of both management and employees (for a course in Distributive Education).

9. To acquire attitudes and skills that help to establish values that strengthen home and family life (for a Home Economics course).

(Continued)

STATE D (Cont'd)

10. To learn to make intelligent choices and how to carry them out in the use of personal, family and community resources (for a Home Economics course).

11. Perform all the tasks of maintaining the home in the simplest and most effective way for family happiness (for a Home Economics course).

12. To learn how to assume responsibility for participating in affairs of the community affecting the family (for a Home Economics course).

13. Learn how to create a home and community environment conducive to the healthy growth and development of all members of the family at all stages of the family cycle (for a Home Economics Course).

STATE E

1. To develop new programs of vocational education.

2. To provide for ancillary services and activities to ensure quality in all vocational education programs.

3. To make provision so that persons of all ages, in all communities will have ready access to vocational education that qualifies them for employment or retraining as needed for continued employment.

4. To develop vocational education programs that are of high quality, realistic in the light of actual opportunities for employment, and are suited to the needs, interest and abilities of students participating in such training.

5. To improve, strengthen, and expand an educational program designed primarily to fit individuals for gainful employment in recognized occupations.

6. To provide part-time employment for youths who need the earnings from such employment to continue their vocational education on a full-time basis.

7. To provide for construction of area vocational school facilities.

8. To maintain, extend, and improve existing programs of vocational education.

ADDITIONAL STATE OBJECTIVES AND GUIDELINES

STATE F

1. To fit persons for useful employment.
2. The state perceives its role as one of monitoring program development within the guidelines provided by the federal government in its funding legislation.
3. To develop programs that will help to attract population to our State so as to develop our natural resources.
4. To equip our young people with a salable skill so they can be employed wherever they choose to locate.
5. To develop housing for this phase of vocational education (area vocational schools).
6. To educate the various publics to an appreciation of the role, goals, and objectives of vocational education.
7. To increase the effectiveness of vocational education in the State.

OBJECTIVES FOR PUBLIC EDUCATION IN MICHIGAN

1. To understand and appreciate American democracy, including the rights and responsibilities of its citizens, and to be diligent and competent in performing obligations as members of the family and community and as citizens of the state, the nation, and the world.

2. To grow in ability, to think rationally, to express ideas clearly, and to read and to listen with understanding.

3. To develop basic communication skills and mathematical concepts in such a ways as to be functionally useful.

4. To develop abilities, attitudes, skills, and understandings that make a person an intelligent, occupationally competent participant in the changing economic life.

5. To develop the attitudes, competencies, and understandings basic to satisfying family life.

6. To develop capacities to appreciate nature and the arts in our own and other cultures.

7. To understand the methods of natural and social sciences, the influences of science on human life, and the nature of the universe and of man.

8. To develop and maintain good physical and mental health.

9. To grow in insight into moral and spiritual values and to act in accordance with these values.

10. To be able to use leisure time effectively.

11. To understand and to appreciate the American economic system.

12. To be able to purchase and conserve human and material resources and use goods and services intelligently.

GOALS FOR VOCATIONAL-TECHNICAL EDUCATION

As part of the planning for the development of vocational-technical education in the Commonwealth, and to provide appropriate educational opportunities and services to all Pennsylvanians, the State Board for Vocational Education adopted the following Goals:

1. Occupational education programs should be broadened and extended with special consideration to employment needs and skills and to present and future labor market needs.

2. Programs and services should be provided to correct educational deficiencies or handicaps which prevent persons from benefiting from instruction essential to employment. Vocational guidance and counseling should be provided at all levels of programs, and recourse should be available to other social services and agencies where needed.

3. Special arrangements should be made to assist metropolitan and other areas having unique occupational education needs and where unique occupational problems exist.

4. Expansion of programs should be accompanied by a comprehensive large-scale program of research and demonstration in occupational education and related programs.

5. Programs should be planned to include persons of many age groups, of varying educational status, of divergent abilities and needs, and at all locations in the state. Existing educational agencies, new area facilities and community college facilities should be constructed and utilized as needed.

6. Vocational guidance, consisting of personal and educational guidance relating to occupational programs and employment opportunities, should be developed consistent with Goal #1. This service should be available to students, parents, and employers.

7. Work-study programs should be available to qualified youth to enable them to commence or continue occupational preparation in high schools and two-year colleges.

8. As a means of preparing adults to enter the labor market or to upgrade skills or acquire new ones, pre-employment training and retraining should be available to adults in schools and classes conducted by local public schools, area schools, two-year colleges and other public and private institutions. Practical related

instruction, supplemental to on-the-job training, should be accessible to apprentices and other trainees throughout their work experience.

9. Occupational education and retraining should be provided by a variety of institutions and agencies, including high schools, community colleges, and other institutions and agencies. Where necessary, occupational education should be arranged with private educational institutions or agencies.

10. Programs should be coordinated under a state plan, with emphasis on articulation of both general and occupational education at secondary and higher educational levels.

11. Leaders in education should improve their understanding with respect to the articulation of both general and occupational education at the secondary and two-year college levels.

12. Quality should be assured by improving administration, instruction, supervision, instructional materials, and leadership education. Programs and activities should be developed for this purpose.

13. State Board policies should be adopted to provide needed incentives to extend occupational education programs in all areas of the state, especially in areas where they are not now accessible, and to extend two-year college programs to more persons.

OBJECTIVES OF VOCATIONAL EDUCATION AND TRAINING
(As presented by the panelists)

1. To provide quality education and training for all people.
2. To provide people with saleable skills.
3. To improve collection and utilization of data on unemployment and job openings.
4. To provide realistic occupational education in all secondary schools.
5. To use all public and private schools more effectively.
6. To expand existing and develop new school facilities as needed.
7. To increase the use of research for improvement of education programs.
8. To accomplish coordination of training programs between public and private agencies.
9. To improve the image of occupational education.
10. To develop close cooperation between education, industry and labor.

From Governor's Symposium on Education
State of New Jersey
October 6, 1966

OCCUPATIONAL EDUCATION AND THE AIMS OF PPB

The principal objective of PPB is to arrive at improved decisions and allocation of resources using a comprehensive systems approach. In conducting the reconnaissance surveys of vocational and technical education, the following aims of PPB were used as criteria in examining the planning and decision-making process:

- Define Objectives and Goals

Explicitly define the objectives and goals of vocational and technical education. The first step in the planning process is the establishment of clearly formulated objectives and goals so that all actions of the educational enterprise can be concentrated upon their achievement.

- Establish a Program Structure and Design Alternative Ways to Attain Objectives and Goals

Establish a program structure that groups activities of occupational education into a set of program categories that facilitates identification or development of alternative programs to attain the objectives and goals and their analytical comparison. For example, contributions to the reduction of unemployment could be achieved through vocational and technical education in public or proprietary schools, through manpower training programs of the kind conducted by the Department of Labor, through secondary or postsecondary education, through programs of training within industry, or through subsidies to industry and unions to encourage expanded training programs in the private sector. The surveys examined the extent to which such alternatives were identified or considered as part of the decision-making processes at the state and local level.

- Establish a Multiyear Program and Financial Plan

Establish multiyear programs and budgets concentrating on outputs or goals. The survey examined whether operating budgets were prepared for five years or other multiyear time periods to determine whether total rather than partial costs were displayed. Frequently, a budget will be shown for only one or two years. The decision-maker, in approving the one-year budget, may be making commitments for several years in the future without the subsequent costs being visible.

- Conduct Analytical Studies

Establish an analytical capability to conduct studies and compare and display the probable benefits and costs of the alternatives through systematic analyses. Facilitate choice among alternative programs by educational administrators through display of more accurate, specific, and comprehensive data, including total rather than partial costs, assumptions, and the advantages and disadvantages of different courses of action. The choice of a particular alternative means that available resources can no longer be applied for the achievement of goals through alternatives not approved. The choice, therefore, precludes the furtherance of other opportunities. Decisions should be based on full display of information. For the educational administrators who must make the overall decisions, the structuring of alternatives is probably the most creative part of the planning process, since it calls on the inventiveness of the program planner to devise innovative ways of accomplishing the objectives. The systematic analysis requires disciplined application of modern analytical techniques such as model building, development of criteria to rank the alternatives in order of desirability, benefit/cost and effectiveness/cost analyses, and operations research.

- Provide Continuous Evaluations

Provide continuous evaluation and measurement of actual performance and progress in attaining goals or the lack thereof. In education, basic questions must be asked as to the value of what is being done. Are course offerings related to job demand? If so, how? Were any courses dropped recently? If so, why? What kinds of analytical and evaluation studies are conducted, and what uses are made of them? How is performance and effectiveness measured? Has a formal program review system been established? What basic policies, concepts, and assumptions guide the planning process? Do information processing and display systems provide essential data for use in the planning process? Is evaluation on a continuous operations recycled where appropriate?

- Establish a Formal Approach to Planning

Establish a formal organization and staff it with the necessary professionals with interdisciplinary skills and supporting data systems to perform the PPBS function in a systematic and effective manner.

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